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Tank Waste Remediation System Privatization Phase I Site Evaluation Report



Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management



Westinghouse
Hanford Company Richland, Washington

Management and Operations Contractor for the
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Tank Waste Remediation System Privatization Phase I Site Evaluation Report

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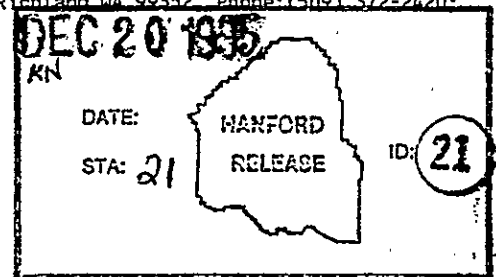
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Abstract: The U.S. Department of Energy has chosen to accomplish the Tank Waste Remediation System disposal mission via privatization. The disposal mission has been divided into two phases. Phase I, a 'proof of concept' phase, will establish and demonstrate the technical, commercial, and procurement capabilities necessary for privatization to proceed. Once established on this relatively small scale, privatization will be expanded, through a second competition, in the form of a second phase (Phase II) to dispose of the remainder of the tank waste. This report recommends a location for the Phase I demonstration facilities in an area, adjoining the 200 East Area, previously developed and characterized for the Grout Disposal Site. The site is of sufficient size for two competing vendors to carry out pretreatment, immobilization, and vitrification operations and possesses the required characteristics (e.g., close to feed tanks) to best facilitate the Phase I operations.

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TANK WASTE REMEDIATION SYSTEM PRIVATIZATION
PHASE I SITE EVALUATION REPORT

1.0 OBJECTIVE

1.1 BACKGROUND

1.1.1 Tank Waste Remediation System (TWRS) Program

The U.S. Department of Energy's (DOE) Hanford Site has the most diverse and largest amount of radioactive tank waste in the United States. High-level radioactive waste has been stored in large underground tanks since 1944. Approximately 230,000 m³ (61 Mgal) of caustic liquids, slurries, salt cakes, and sludges have accumulated in 177 tanks. In addition, significant amounts of ⁹⁰Sr and ¹³⁷Cs were removed from the tank waste, converted to salts, doubly encapsulated in metal containers, and stored in water basins.

A TWRS Program was established in 1991 to manage, retrieve, treat, immobilize, and dispose of these wastes in a safe, environmentally sound, and cost-effective manner. The TWRS pathway for cleanup is formally documented in the *Hanford Federal Facility Agreement and Consent Order*, commonly known as the Tri-Party Agreement (Ecology et al. 1994). Under the Tri-Party Agreement, the DOE, the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology have agreed to a 30-year timetable for cleanup of the Hanford Site.

1.1.2 TWRS Privatization Strategy

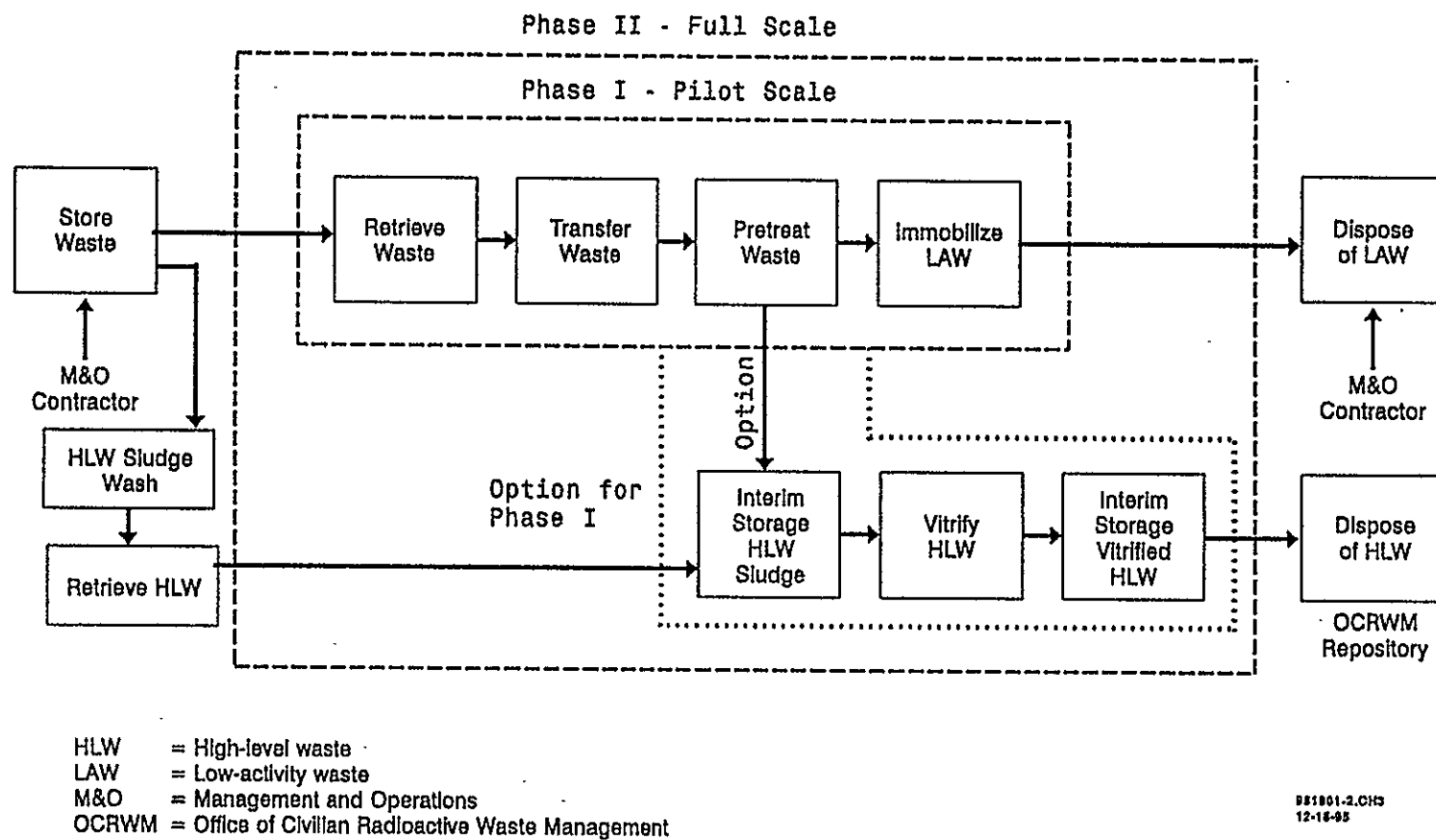
The DOE believes that it is feasible to privatize portions of the TWRS Program (RL 1995). Privatization is defined as vendors, under contract with the DOE, using private funding to design, permit, construct, operate, decontaminate, and decommission their own equipment and facilities to treat tank waste. Payment for these services would take the form of fixed price per unit of product meeting DOE's specifications. Vendors would be selected from a fixed price competitive process.

The privatization of the disposal mission, as formulated by the DOE and schematically shown in Figure 1-1, is divided into two phases (Phase I and Phase II).

Phase I

Phase I is a proof-of-concept/commercial demonstration-scale effort whose objectives are to: demonstrate the technical and business viability of using privatized facilities to treat and immobilize Hanford Site tank waste; define and maintain required levels of nuclear, radiological, and occupational safety; maintain environmental protection and compliance; and substantially reduce life-cycle costs and time required to remediate Hanford Site tank

Figure 1-1. Tank Waste Remediation Privatization Approach.



waste. In this phase, approximately 6% to 13% of the Hanford Site tank waste will be treated. The Phase I effort consists of Part A and Part B.

Phase I, Part A

Phase I, Part A is a 20-month development period to establish the technical, operational, regulatory, and financial elements required in privatized facilities that provide tank waste treatment and immobilization services on a fixed-unit-price basis. Of this 20-month period, 16 months will be used by the contractor to complete deliverables; 4 months will be used to evaluate, select, and authorize performance for Part B.

It is anticipated that multiple offerors will be selected to perform Phase I, Part A, thus ensuring competition and facilitating cost control. Each contract specifies a single firm-fixed price for completion and delivery of all work covered by Phase I, Part A, at which time payment will be made. (An additional single firm-fixed price is specified relating to work covered by an option for high-level waste [HLW] remediation services.)

Phase I, Part B

Phase I, Part B is a demonstration to provide tank waste treatment services at fixed unit prices. Four different waste envelopes are identified for Part B: three waste envelopes for pretreatment and immobilization as low-activity waste and one waste envelope for vitrification as HLW. These waste envelopes are representative of the range of Hanford Site tank waste. The demonstration period will range between 9 and 13 years. Wastes will be processed during a 5- to 9-year period of Phase I, Part B, and will result in 6% to 13% of the total tank waste being treated. Part B will conclude with completion of decontamination and decommissioning, *Resource Conservation and Recovery Act of 1976* (RCRA) closure, and site restoration (2 additional years).

Based on Phase I, Part A performance, one or more of the contractors that successfully performed Phase I, Part A, will each be authorized to perform waste treatment services for the DOE in Phase I, Part B. The waste treatment services will be paid for by the DOE on a fixed-unit-price basis as specified in each of the contracts. One of these contractors may provide the HLW vitrification services that are included in the draft Request for Proposal (RFP) (RL 1995) as an option.

Phase II

Phase II is projected to be the subject of a future competitive solicitation. Phase II would be the full-scale production phase, in which the facilities would be configured so all the remaining waste can be processed and immobilized on a schedule that will accommodate removing the waste in single-shell tanks by 2018. The objectives of Phase II would be to implement the lessons learned from Phase I, process all tank waste into forms suitable for final disposal, achieve price competition and cost savings throughout the Phase II effort, and meet or exceed the Tri-Party Agreement benchmark performance milestones.

1.2 PURPOSE AND SCOPE

The purpose of this site evaluation is to support the TWRS Privatization RFPs by identifying a location for the Phase I demonstration facilities. The evaluation was conducted in accordance with WHC-CM-8-7, *Operations Support Services*, Section 905, "Site Selection." The ICF Kaiser Hanford Company (ICF KH) Infrastructure/Land Use Planning organization was consulted and participated throughout the evaluation. A Site Evaluation Team was organized that reflected organizations/personnel either responsible for, or knowledgeable of, the assigned site criteria. The following methodology was used to develop a site recommendation.

- Identify applicable site criteria, assumptions, and Site Evaluation Team.
- Identify alternative sites.
- Evaluate the alternate sites against the criteria and performance measurements established by the Site Evaluation Team.
- Recommend a location for the Phase I demonstration facilities.

2.0 SUMMARY

This report recommends approval of a site location for construction and operation of demonstration facilities to carry out the TWRS privatization Phase I work scope.

The evaluation was conducted in accordance with established procedures. Site criteria and assumptions were identified. A Site Evaluation Team was formed that reflected organizations/personnel either responsible for, or knowledgeable of, assigned site criteria.

Based on previous TWRS site evaluation efforts (before privatization), the 'must' (quantitative/go-no-go) criteria, and inspections of the area, four alternative sites were selected for evaluation. The alternative sites are within, or adjacent to, the 200 East Area in the vicinity of the AP Tank Farm, which will be used for feed staging. The sites were evaluated by the Site Evaluation Team using stakeholder value-based selection criteria and associated performance measurements. Briefings and discussions were held during the evaluation process between members of the privatization Contractor Support Team and members of the Hanford Advisory Board.

The recommended location for the TWRS privatization Phase I complex is shown in Figure 5-1. This area, adjoining the 200 East Area and previously developed and characterized for the Grout Disposal Site, was the highest ranked and had the most desirable features of the candidate sites. The area is of sufficient size for two competing vendors to carry out pretreatment, immobilization, and vitrification operations and possesses the required characteristics (e.g., close to feed tanks) to best facilitate the Phase I operations. The site is also expected to accommodate changes in facility sizes or the addition of new facilities that may be required (e.g., interim storage of HLW or low-level waste [LLW]).

The recommended location should be approved for TWRS privatization Phase I use.

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3.0 DESCRIPTION OF ALTERNATIVES

3.1 200 AREAS

As described in the *Hanford Site Development Plan* (RL 1994) and the *Hanford 200 Areas Development Plan* (Rinne and Daly 1993), and shown in Figure 3-1, the Hanford Site 200 Areas (Central Plateau) reflect land that has been heavily used for nuclear fuel reprocessing and waste management and disposal activities. As such, the 200 Areas (specifically the 200 East and 200 West Areas) will be dedicated for future site-wide waste disposal and tank waste remediation activities. *The Future for Hanford: Uses and Cleanup--The Final Report of the Hanford Site Uses Working Group* (Drummond 1992) included the following recommendations relative to the waste management function of the Central Plateau.

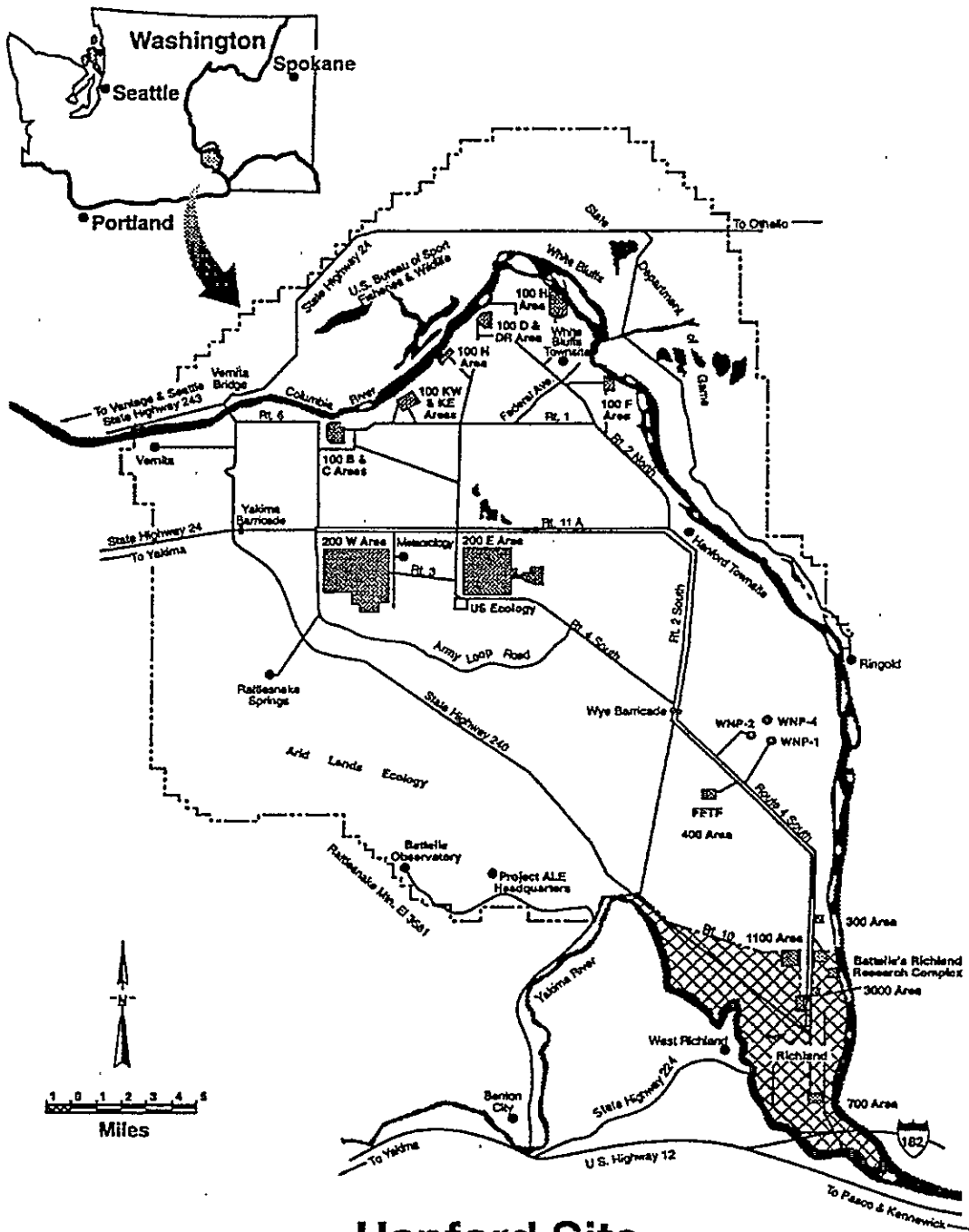
- "Waste from throughout the Hanford Site should be concentrated in the 200 Area; thus wastes would be moving into the 200 Area from across the site."
- "Waste management, storage, and disposal activities in the 200 Area and immediate vicinity should be concentrated within the 200 Area whenever feasible to minimize the amount of land devoted to, or contaminated by, waste management activities. When bringing wastes to the area, adverse effects should be minimized, especially to currently uncontaminated areas of the Central Plateau."
- "The waste management area would encompass the 'squared off' boundaries of the current 200 Area (expanded to include the area to the east of the 200 East Area where Grout vaults are planned to be located)."
- "The remainder of the Central Plateau, including the 200 North Area, that encircles the waste management area would be designated a 'buffer' area to reduce the risks that are expected to continue to emanate from the waste management area." See Figure 3-2.

3.2 200 EAST AREA LOCATION

Based on the information presented in Section 3.1, the TWRS disposal mission could be located within/adjacent to the 200 East or 200 West Areas. The 200 East Area location was selected for the following reasons.

- Based on WHC-SD-WM-TI-613, *TWRS Process Flowsheet* (Orme 1995), pretreatment of tank waste would be done by the in-tank sludge washing process in the 200 East Area Tank Farm Complex. As shown in Figure 3-3, from a conceptual standpoint, tank waste from the 200 West Area would be retrieved to the SY Tank Farm and transferred cross-site to the AW Tank Farm where in-tank sludge washing would be performed. Waste in the 200 East Area would be retrieved to the AN Tank Farm where it would be washed and separated into HLW and LLW streams. The LLW streams would be pumped to the AP Tank Farm and

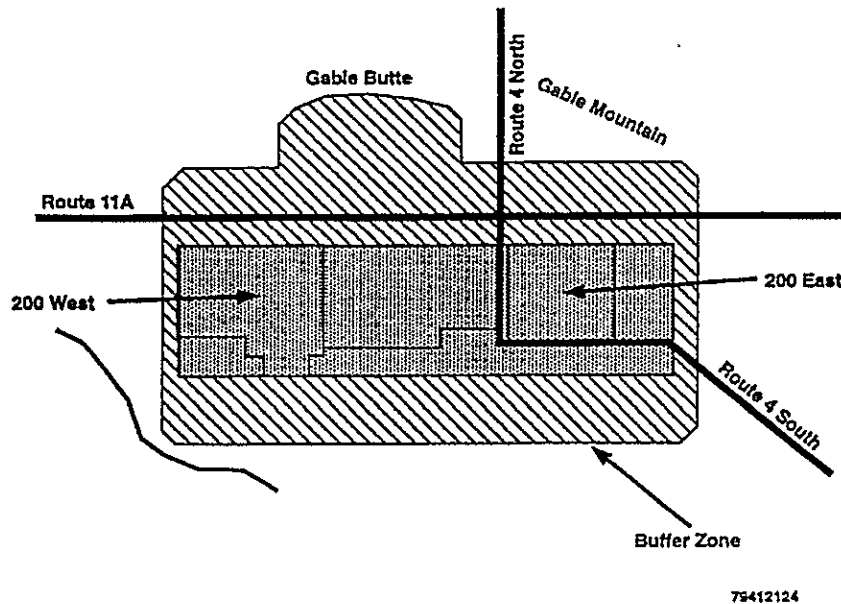
Figure 3-1. Location of the Hanford Site and the 200 Areas.



Hanford Site Department of Energy

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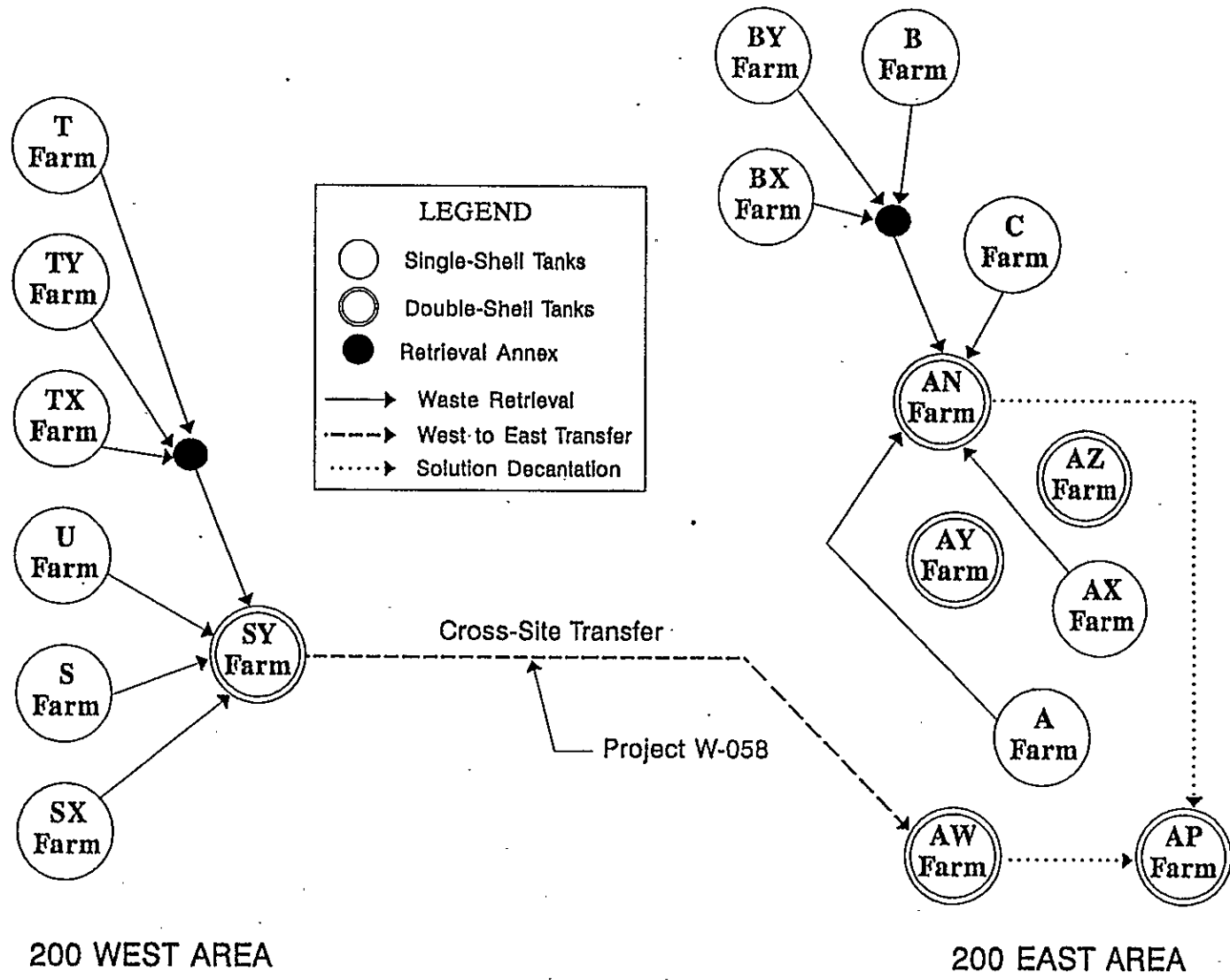
Figure 3-2. 200 Areas.



then to the pretreatment and LLW immobilization facilities. The HLW streams would be pumped directly from the AN and AW Tank Farms to the HLW vitrification facility, or to interim storage.

- The Hanford Site has consolidated activities during the past 20 years in the 200 East Area (as opposed to the 200 West Area) which has placed much of the necessary facilities and infrastructure in and around the 200 East Area.
- There is more available/useable land in the 200 East Area than the 200 West Area, i.e., land that is unused or is reserved for other use.

Figure 3-3. Tank Waste Retrieval and In-Tank Processing Concept.



3.3 ALTERNATIVE SITES

Based on initial direction received from RL which was subsequently reflected in the *Tank Waste Remediation System Privatization Request for Proposals* (Draft) (RL 1995) and the *Tank Waste Remediation System Complex Site Evaluation Report* (Shord 1995*), four alternative sites were selected for evaluation. The major criterion used to identify the alternative sites was close proximity to the 241-AP-106 and 241-AP-108 Tank Farm feed tanks. The alternative site locations are shown in Figure 3-4.

- Site 1: An area that is the closest to the 241-AP Tank Farm. Space limited. Outside any established boundary.
- Site 2: An area that is close to the 241-AP Tank Farm. In relatively pristine condition. Outside any established boundary.
- Site 3: An area relatively close to the 241-AP Tank Farm. Has been fenced off and partially disturbed for the (canceled) Grout Disposal Site.
- Site 4: An area further from the 241-AP Tank Farm. Within the current 200 East boundary. Largest of all alternative sites. Has been previously evaluated (before privatization concept) and recommended for location of the TWRS production facilities to treat tank waste, vitrify HLW and LLW, dispose of LLW, and interim store HLW (Shord 1995).

*This report recommended a site location for construction and operation of a TWRS Complex in the Hanford Site 200 East Area. The report preceded a privatization strategy and addressed the remediation of all Hanford Site tank wastes from a production facility standpoint.

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4.0 DISCUSSION OF ALTERNATIVES

4.1 SITE SELECTION CRITERIA

4.1.1 Must (Quantitative/Go-No-Go) Criteria

The following site 'must' criteria were obtained or derived from the *Tank Waste Remediation System Privatization Request for Proposals* (Draft) (RL 1995).

1. One or more of the contractors that successfully performed Phase I, Part A, will each be authorized to perform Phase I, Part B waste treatment services. One of these contractors may provide the HLW vitrification services. As such, two sites are assumed (two vendors/one site per vendor). The size of the sites will be such that the Phase I contractors can conduct pretreatment, LLW immobilization, and HLW vitrification. The minimum size of each vendor site shall be 10 acres.
2. The Phase I demonstration facilities may remain in place and operational to support the Phase II tank waste treatment production effort (see Appendix A). As such, the Phase I demonstration facilities shall be sited such that they do not interfere with Phase II production operations.
3. Tanks 241-AP-106 and 241-AP-108 in the 200 East Area will be used for feed tanks for the privatization vendors.

4.1.2 Want (Qualitative) Criteria

Decision process guidelines previously established for TWRS (Alumkal 1994) were used. Specifically, privatization guidelines (RL 1995), stakeholder values,* and additional Hanford Site contractor values important to regulatory compliance, reduction of mission risk, and cost were used to establish the qualitative site evaluation criteria. Not all values were found to be significant discriminators (values and criteria that serve to distinguish one site location/configuration from another). The values and how they were considered are summarized as follows:

Stakeholder and Contractor Values

- Protect the environment.
- Protect the Columbia River.
- Deal realistically and forcefully with groundwater contamination.

*Values were derived from the final report of the Hanford Future Site Uses Working Group (Drummond 1992) and the final report of the Hanford Tank Waste Task Force (Drummond 1993).

- Do no harm during cleanup or with new development.
- Protect public/worker health and safety.
- Transport waste safely and be prepared for emergencies.
- Use the Central Plateau wisely for waste management.
- Clean up to the level necessary to enable the future use option to occur.
- Clean up areas of high future use value.
- Capture economic development opportunities locally.
- Involve the public in future decisions about the Hanford Site.
- Establish management practices to ensure accountability, efficiency, and allocation of funds to high-priority items.
- "Get on with the cleanup" to achieve substantive progress in a timely manner.
- Use a systems design approach that keeps end points in mind as intermediate decisions are made.
- Cost.
- Operating considerations.
- Flexibility.
- Regulatory risk.
- Technical risk.

Applicability of Values to TWRS Phase I Privatization Site Evaluation

A. Values determined not to discriminate among alternatives

1. Clean up to the level necessary to enable future use option to occur.

Clean up areas of high future use value.

- These values do not discriminate among alternatives because any site will be cleaned up (decontaminated and decommissioned) after the useful life of Phase I operations.

2. Involve the public in future decisions about the Hanford Site.
 - This value does not discriminate among alternatives because the stakeholders will be consulted relative to the siting of the Phase I facilities.
3. Establish management practices to ensure accountability, efficiency, and allocation of funds to high-priority items.
 - This value does not discriminate among alternatives because the development of any selected site will employ the same established management practices.
4. Use a systems design approach that keeps end points in mind as intermediate decisions are made.
 - This value does not discriminate among alternatives because the evaluations of all sites are based on systems engineering and associated trade studies.
5. Capture economic development opportunities locally.
 - This value does not discriminate among alternatives because any time a project (privatization or otherwise) brings in a firm to the community, it is an economic improvement to the local area. The site location has no factor in the economic development to the local area.

B. Values used to establish site selection criteria

1. Protect the environment.
 - a. Protect the Columbia River.
 - b. Deal realistically and forcefully with groundwater contamination.
 - c. Do no harm during cleanup or with new development.
2. Protect public/worker health and safety.
 - Transport waste safely and be prepared for emergencies.
3. Use the Central Plateau wisely for waste management.
4. "Get on with the cleanup" to achieve substantive progress in a timely manner.
5. Cost.
6. Flexibility.
7. Risks (technical, operational, construction, planning, regulatory).

A review was conducted of past site evaluations from which a comprehensive list of qualitative site criteria was developed. The site criteria were then fit into the value categories listed in this section. The complete list of site criteria is contained in Table 4-1.

4.1.3 Site Evaluation Team

A Site Evaluation Team was organized to evaluate the site criteria. As previously mentioned, the team reflected organizations/personnel either responsible for, or knowledgeable of, the site criteria in their respective areas. The evaluators defined the Performance Measurements to be used to evaluate their assigned criteria. The Site Evaluation Team and assigned site criterion are shown in Table 4-1.

4.2 ASSUMPTIONS

1. The requirements and conditions set forth in the *Tank Waste Remediation System Privatization Request for Proposals* (Draft) (RL 1995) apply. Specific siting elements include the following:
 - Each demonstration facility will pretreat and solidify LLW, extract fission products from the waste, and return HLW sludge and fission products (separate technetium and other fission products streams if possible) for storage by the DOE in preparation for future processing. An option will be included for the Phase I contractor to conduct HLW vitrification.
 - Vendor interfaces with the site are shown in Figure 4-1.
 - The vendor will design and construct any interface needed with the waste feed tanks and provide any upgrades to the waste feed tanks such that they function safely as a part of the vendor's process. The operation control of the feed tanks will be transferred from the DOE to the privatized vendor.
 - Land for facility siting will be provided to the vendor under a no-cost lease/land-use permit that authorizes the vendor to use the property for construction, operation, decontamination, decommissioning, and RCRA closure. The vendor shall be responsible for decontamination, decommissioning, and RCRA closure of the privatized facilities and shall return the site to the DOE fully remediated to the preexisting condition.
2. There is no requirement that the Phase I demonstration plants be physically connected to the Phase II production plants.
3. The fenced-off Grout area is available for siting the Phase I demonstration plants.

Table 4-1. Tank Waste Remediation System Privatization Phase I Qualitative Site Selection Criteria/Evaluation Team. (6 sheets)

Qualitative site selection criteria	Evaluation Team
1. Protect the environment	
a. Cultural, archeological, and historical sites: The site shall not have any areas of cultural, archeological, or historical significance that cannot be reasonably mitigated.	Natalie A. Cadoret, PNNL Hanford Cultural Resources
b. Ecological: The site shall not have any areas of ecological impact that cannot be reasonably mitigated.	Charles A. Brandt, PNNL Ecological Resources
c. Natural resource damage assessment: The site shall minimize/avoid any impacts to natural resources.	John A. Hall, PNNL Ecological Resources
d. Protect the Columbia River and deal realistically and forcefully with groundwater contamination: Ability of the site to meet federal, state, and local requirements for the protection of groundwater. Factors are (1) impact of previous Hanford Site practices (liquid effluent discharges, single-shell tank leaks, disposal actions) on groundwater under site, (2) hydrology of site, and (3) impact of site on proposed future Hanford Site disposal operations (e.g., LLW disposal).	Stuart P. Luttrell (lead) and Darrell R. Newcomer, PNNL Field Hydrology Chemistry Support: Stephen P. Reidel, WHC Geohydrologic Support and Frederik M. Mann, WHC Field Development Project Management
e. Do no harm during cleanup or with new development: The establishment of the privatization site shall minimize the impact to the environment.	Roni J. Swan, WHC Environmental Services

Table 4-1. Tank Waste Remediation System Privatization Phase I Qualitative Site Selection Criteria/Evaluation Team. (6 sheets)

Qualitative site selection criteria	Evaluation Team
<p>2. Protect public/worker health and safety</p> <ul style="list-style-type: none"> a. Transport waste safely and be prepared for emergencies: Minimize the transportation of radioactive and hazardous waste and material through populated areas. b. ALARA: The site shall minimize the adverse affects on the health and safety of personnel. The concept of reducing the exposure of workers to radiological and hazardous substances to ALARA principles will be considered. c. Accidents on the privatization site: Minimize the effects of possible accidents at adjacent facilities on the privatization site. d. Accidents from the privatization site: Minimize the effects of possible accidents at the privatization site and its associated facilities (e.g., transfer lines) on adjacent facilities. 	<p>Jay C. Lavender, PNNL Decision, Safety, and Risk Management</p>
<p>3. Use the Central Plateau wisely for waste management</p> <p>Land use planning: Site should be in concert and not conflict with the <i>Hanford Site Development Plan</i>,^a the <i>Hanford 200 Areas Development Plan</i>,^b <i>The Future for Hanford: Uses and Cleanup--The Final Report of the Hanford Site Uses Working Group</i>,^c and other land use planning documents.</p>	<p>Edward F. Yancey, ICF KH Infrastructure/Land Use Planning</p>
<p>4. "Get on with the cleanup" to achieve substantive progress in a timely manner. Support meeting the Tri-Party Agreement^d schedule.</p>	<p>Mary A. McLaughlin, WHC Tri-Party Agreement Integration</p>

Table 4-1. Tank Waste Remediation System Privatization Phase I Qualitative Site Selection Criteria/Evaluation Team. (6 sheets)

Qualitative site selection criteria	Evaluation Team
<p>5. Construction Costs</p> <ul style="list-style-type: none"> a. Utilities: Installation/upgrade costs of electricity, raw water, sanitary water, steam, and telecommunications. Considers existing and planned utilities. b. Rail/roads: Installation/upgrade costs of rail and roads. c. Waste transfer lines: Installation costs of waste transfer lines from the 241-AP Tank Farm to the privatization sites. d. Liquid effluent disposal: Installation of liquid effluent disposal lines from the privatization site to the liquid effluent disposal system. e. Construction proximity: The ability to locate temporary construction support facilities close to the facilities being constructed and the availability of adequate laydown and construction support areas. f. Construction commonality: Maximum use of common construction support needs (e.g., laydown areas, utilities, parking, batch plant, offices, shops, warehouses, change rooms, etc.) between projects or construction phases of multiple facilities of the same project. g. Site preparation: Costs associated with earth-moving activities necessary to complete construction. Includes topography, site irregularities, finish grade elevation, and removal/relocation of existing structures. 	<p>John D. Galbraith (lead) and Carole E. Leach, WHC/TWRS Process Design</p> <p>Support: Privatization Facility Site Infrastructure Team (Task WBS 7.4.2) John H. Holbrook (task leader), PNNL</p>

Table 4-1. Tank Waste Remediation System Privatization Phase I Qualitative Site Selection Criteria/Evaluation Team. (6 sheets)

Qualitative site selection criteria	Evaluation Team
<p>6. Operating Considerations</p> <p>a. Operating costs between the various sites shall be qualitatively assessed and include items such as facility and feed/waste transfer costs (flushing, dilution of waste, concentration of diluted waste [evaporation of waste to manage double-shell tank space], line drain back, etc.). The potential for transfer line plugging should be minimized to the extent possible. Factors to be considered should include waste transfer system configuration (i.e., number of process pits), line traps, quantity of flush water after each transfer, line drain back to low point, number of low points in system, dilution requirement to mitigate plugging of transfer system, pumping requirements (minimize the use of pump booster stations), and siphoning effect between the shipping location and the processing facilities. In essence, the intertank/facility piping should be free draining (to the extent practical) to the transfer destination.</p> <p>b. Proximity to assigned vendor feed tank: The distance between the privatization site and the double-shell feed tanks in the 241-AP Tank Farm shall be kept to a practical minimum.</p>	<p>John D. Galbraith (lead) and Carole E. Leach, WHC/TWRS Process Design</p> <p>Support: Privatization Facility Site Infrastructure Team (Task WBS 7.4.2) John H. Holbrook (task leader), PNNL</p>
<p>7. Flexibility</p> <p>a. Site expansion: Adequate expansion area should be available for future privatization options. Although the expansion area cannot be quantified at this point, more potential expansion area is preferable to less.</p> <p>b. Access: Ease of access to the privatization sites.</p>	<p>E. Ted Trost, ICF KH Infrastructure/Land Use Planning</p>

Table 4-1. Tank Waste Remediation System Privatization Phase I Qualitative Site Selection Criteria/Evaluation Team. (6 sheets)

Qualitative site selection criteria	Evaluation Team
<p>8. Risks</p> <p>a. Above/belowground interferences and contamination: Minimize potential problems to be encountered during construction and operation due to existing above or belowground structures or radioactive/hazardous contamination.</p>	<p>Robert G. Riley, PNNL Field Hydrology Chemistry</p> <p>Support: Stephen P. Reidel, WHC Geohydrologic Support and Roni J. Swan, WHC Environmental Support</p>
<p>b. Seismic: The distance to known earthquake faults shall be taken into consideration.</p>	<p>George V. Last (lead) and Mark T. Murphy, PNNL Applied Geology & Geochemistry</p> <p>Support: Stephen P. Reidel, WHC Geohydrologic Support</p>
<p>c. Site activities: The impact to other site activities and operating facilities during construction and operation should be kept to a minimum.</p>	<p>Edward F. Yancey, ICF KH Infrastructure/Land Use Planning</p>
<p>d. Vendor-to-vendor interference: The vendor facility sites shall be such that one vendor's activities or upsets do not hinder or prevent progress to be made by a separate vendor.</p>	<p>John D. Galbraith (lead) and Carole E. Leach, WHC/TWRS Process Design</p>
<p>e. Siting, infrastructure, and support incompatibility with vendor's operating concepts: The siting shall be such that Hanford Site infrastructure and support are (or can be feasibly made) compatible with the vendors' operating concepts.</p>	<p>John D. Galbraith (lead) and Carole E. Leach, WHC/TWRS Process Design</p>
<p>f. Siting, infrastructure, and support incompatibility with DOE privatization strategy: The siting shall be such that Hanford Site infrastructure and support are (or can be feasibly made) compatible with the DOE's overall strategy to complete the full waste processing mission</p>	<p>John D. Galbraith (lead) and Carole E. Leach, WHC/TWRS Process Design</p>

Table 4-1. Tank Waste Remediation System Privatization Phase I Qualitative Site Selection Criteria/Evaluation Team. (6 sheets)

^aRL, 1994, *Hanford Site Development Plan*, RL-W94-044 (DRAFT), U.S. Department of Energy, Richland Operations Office, Richland, Washington.

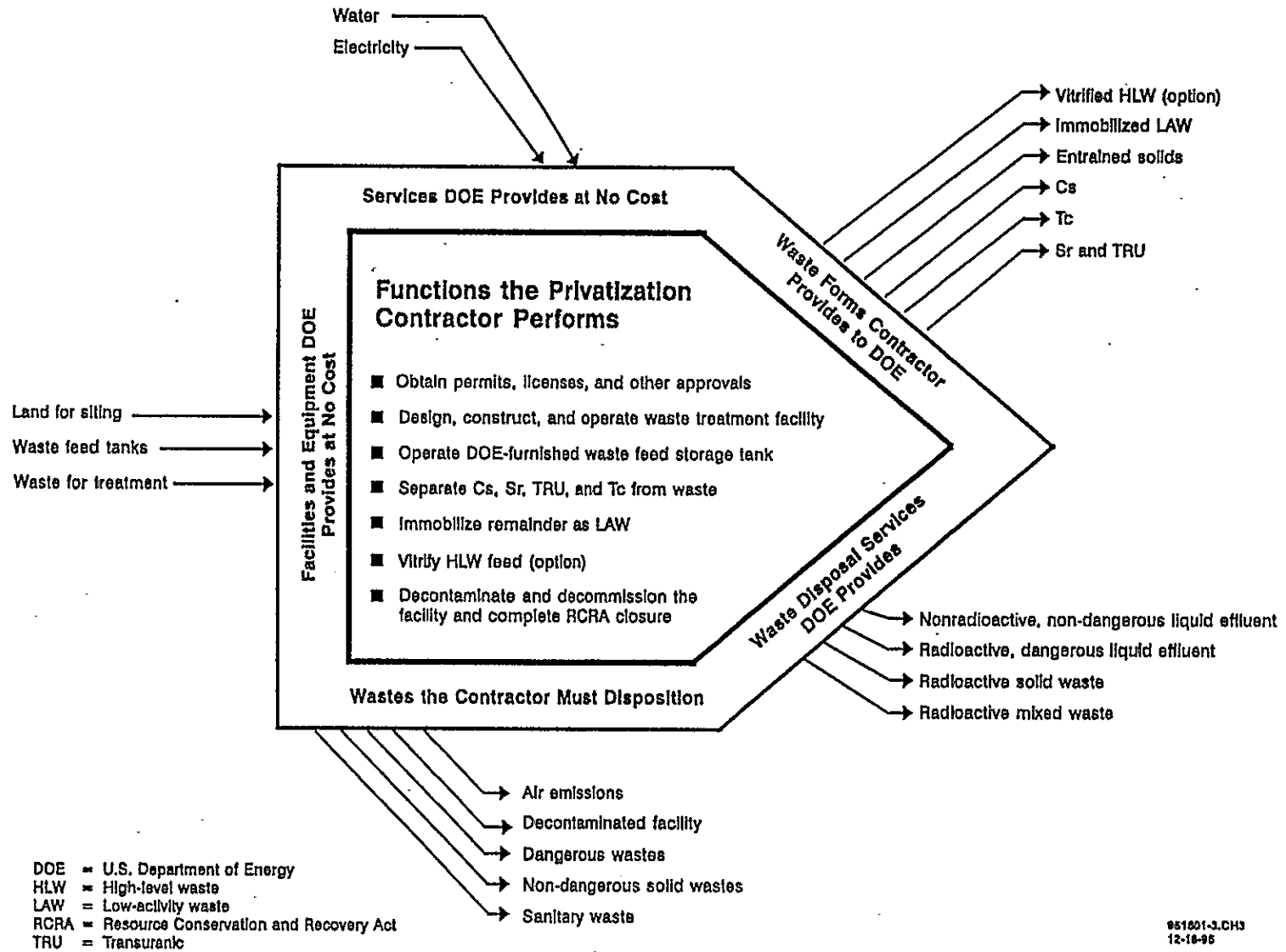
^bRinne, C. A., and K. S. Daly, 1993, *Hanford 200 Areas Development Plan*, DOE/RL-92-29, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

^cDrummond, M. E., 1992, *The Future for Hanford: Uses and Cleanup--The Final Report of the Hanford Site Uses Working Group*, Chaired by M. E. Drummond, President of Eastern Washington University, Cheney, Washington.

^dEcology, EPA, and DOE, 1994, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

ALARA = As low as reasonably achievable
ICF KH = ICF Kaiser Hanford Company
PNNL = Pacific Northwest National Laboratory
TWRS = Tank Waste Remediation System
WBS = Work breakdown structure
WHC = Westinghouse Hanford Company

Figure 4-1. Privatization Functions, Inputs, and Outputs.



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4.3 EVALUATION OF ALTERNATIVES

Alternative sites were evaluated by the Site Evaluation Team members based on the Performance Measurements for their assigned criteria. Site 1 was excluded from the evaluation because it did not meet the must criteria (specifically the size requirement), contained a sanitary tile field, and is surrounded by contaminated areas.

The Site Evaluation Team evaluations are contained in Appendix B with the results summarized in Table 4-2. The evaluations were conducted based on the 'pro's' and 'con's' for each site to avoid numerical judgements. This was done to better serve the program and oversight groups by identifying the site factors that were the difference in arriving at a preferred site. In addition, the Phase II (production facilities) land requirements were factored into the evaluations from the standpoint of the ability of any of the alternative sites to collocate the Phase I and Phase II facilities. The conclusion, based on the current privatization strategy, was that it is not feasible to collocate the Phase I and Phase II facilities (Appendix C).

Table 4-2. Summary of Site Evaluations. (7 sheets)

Qualitative site selection criteria	Summary of key findings for Alternative Sites 2, 3, and 4	Preferred site
1. Protect the environment		
a. Cultural, archeological, and historical sites	<p>All sites: No archaeological sites have been identified that are potentially eligible for the National Register of Historic Places. The potential for subsurface archaeological deposits is low.</p> <p>Pro for Site 3: Much of the area already has been disturbed by the former Grout Facility operations.</p>	3
b. Ecological	<p>All sites: No endangered species are present.</p> <p>Con for Site 2: Majority of the wildlife habitat is pristine. Baseline maps of habitat quality show this area to be among the highest quality shrub-steppe on the Hanford Site.</p> <p>NOTE: If placing Phase I in Site 4 precludes its use by the Phase II production facilities (a much larger impact than Phase I because the Phase II facilities would need to be located elsewhere), the preferred siting option for Phase I is Site 3.</p>	4/3
c. Natural resource damage assessment	<p>All sites: Avoids/minimizes impacts to groundwater and surface water, and contains no unique geologic features or water resources that provide significant services.</p> <p>Con for Site 2: Contains the most unfragmented amount of high quality, late-successional, sagebrush-steppe habitat that is used by species of concern. Has potentially the highest biological resource service value of any of the sites because it is outside the designated waste management areas.</p> <p>NOTE: If placing Phase I in Site 4 precludes its use by the Phase II production facilities (a much larger impact than Phase I because the Phase II facilities would need to be located elsewhere), the preferred siting option for Phase I is Site 3.</p>	4/3

Table 4-2. Summary of Site Evaluations. (7 sheets)

Qualitative site selection criteria	Summary of key findings for Alternative Sites 2, 3, and 4	Preferred site
d. Protect the Columbia River and deal realistically and forcefully with groundwater contamination	All sites: Groundwater contamination is present beneath all sites; however, this contamination would not impact construction or operation because another source of water will be required for construction and consumption. The groundwater pathways and travel times to the Columbia River are similar for all sites. The Phase I facilities will have no land-based disposal units as defined under the <i>Resource Conservation and Recovery Act of 1976</i> ¹ and are not expected to have an impact on groundwater or future plans related to groundwater.	None
e. Do no harm during cleanup or with new development	<p>Con for Site 2: Has not been characterized. Feed lines would have to bypass contaminated areas, requiring longer length of transfer pipeline and resultant environmental effects. Would require the greatest habitat destruction and resultant mitigation.</p> <p>Pro for Site 3: Substantial amount of environmental characterization data available from former Grout Facility program. No known surface contamination. Within a fenced controlled area. Close to feed source relative to length of transfer pipeline required, thereby minimizing environmental effects.</p>	3
2. Protect public/worker health and safety		
a. Transport waste safely and be prepared for emergencies	Con for Site 4: Site 4, because it is furthest away from the AP Tank Farm, would result in an increased risk to onsite individuals from a waste transfer standpoint.	2 or 3
b. ALARA	Pro for Site 3: Site is located away from areas of high onsite traffic.	3
c. Accidents on the privatization site	The potential impacts for each site are approximately the same.	None

Table 4-2. Summary of Site Evaluations. (7 sheets)

Qualitative site selection criteria	Summary of key findings for Alternative Sites 2, 3, and 4	Preferred site
d. Accidents from the privatization site	Pro's for Sites 2 and 3: Although the doses would be below the WHC risk guidelines for all sites, Sites 2 and 3, located to the east and south of the 200 East Area, are more favorable because there are no facilities in the prevailing wind direction downstream of the sites.	2 or 3
3. Use the Central Plateau wisely for waste management	<p>Site 4 is the only site that is located inside the currently recognized fence boundary of the 200 East Area.</p> <p>NOTE: Drummond stated² that the interior portion of the Central Plateau would be designated for waste management activities and that specifically, "The waste management area would encompass the 'squared off' boundaries of the current 200 Area (expanded to include the area to the east of the 200 East Area where the Grout Vaults are planned to be located)". ICF KH will address this boundary issue as part of its land use management activities for the 200 East Area in fiscal year 1996.</p>	4
4. "Get on with the cleanup" to achieve substantive progress in a timely manner. Support meeting the Tri-Party Agreement ³ schedule.	This criterion was determined not to be a discriminator.	None

Table 4-2. Summary of Site Evaluations. (7 sheets)

Qualitative site selection criteria	Summary of key findings for Alternative Sites 2, 3, and 4	Preferred site
<p>5. Construction Costs</p> <ul style="list-style-type: none"> a. Utilities b. Rail/roads c. Waste transfer lines d. Liquid effluent disposal e. Construction proximity f. Construction commonality g. Site preparation 	<p>Site 2: Not advantageous if rail service is needed directly to the site. Some difficulty in providing underground waste transfer lines connecting the AP Tank Farm to vendor facilities. Site is least favorable from the standpoint of the amount of earth movement that would have to be done to make the site suitable for construction of a processing facility.</p> <p>Site 3: The most favorable site from the standpoint of installation of underground waste transfer lines connecting the vendor facilities to the AP Tank Farm. Not advantageous if rail service is important.</p> <p>Site 4: The strongest detractor is the difficulty in providing underground waste transfer line connection to the AP Tank Farm. Other than the waste transfer issue, Site 4 is equal to or better than Sites 2 and 3 in all other respects. The present strategy to use multiple vendors could not collocate Phase I (demonstration) and Phase II (production) facilities in any one site. The Phase II production facilities are currently planned to be located at Site 4.</p>	<p>3</p>

Table 4-2. Summary of Site Evaluations. (7 sheets)

Qualitative site selection criteria	Summary of key findings for Alternative Sites 2, 3, and 4	Preferred site
<p>6. Operating Considerations</p> <ul style="list-style-type: none"> a. Operating costs b. Ease of waste transfer c. Proximity to assigned vendor feed tank 	<p>Site 2: Routing transfer lines to this site would require the circumvention of contaminated cribs. There is a possibility that transfer line hydraulic issues could impact portions of the vendor processing site design. It is possible that the vendor may need to be able to handle transfer line volume drain back requiring processing site tankage.</p> <p>Site 3: Routing of waste transfer lines to this site is not expected to be a difficult task. The current site elevations appear to support good transfer line hydraulics.</p> <p>Site 4: The site is a substantial distance from the A Farm Complex which will influence the hydraulics of the transfer system, flush volumes, and installation cost. To connect this site to the A Farm Complex transfer system would require routing lines to either the 244-A Lift Station, the AN Tank Farm, or the new cross-site transfer system (if available to support the Phase I schedule). All these options require extensive evaluation.</p>	<p>3</p>
<p>7. Flexibility</p> <ul style="list-style-type: none"> a. Site expansion b. Access 	<p>Site 2: Adequate expansion capability. Rail access (if needed) would be difficult. Area available - not planned for Phase II production operations.</p> <p>Site 3: Adequate expansion capability. Close proximity to the AP Tank Farm. Rail access (if needed) would be difficult. Area available - not planned for Phase II production operations.</p> <p>Site 4: Close to site infrastructure but farther from AP Tank Farm. Based on current planning, the site for Phase II production operations. Current privatization strategy would preclude Phase I and Phase II operations at any one site.</p>	<p>3</p>

Table 4-2. Summary of Site Evaluations. (7 sheets)

Qualitative site selection criteria	Summary of key findings for Alternative Sites 2, 3, and 4	Preferred site
<p>8. Risks</p> <p>a. Above/belowground interferences and contamination</p> <p>b. Seismic</p> <p>c. Site activities</p>	<p>Sites 2 and 3: Historically, these sites have been located outside the 200 East Area waste management area, suggesting a much lower probability of encountering unsuspected radioactive or hazardous contamination and above/belowground structures that would impede facility construction and operation activities.</p> <p>Site 4: Historically, the northern area of Site 4 has seen higher levels of surface radiation releases than at Sites 2 and 3. These higher levels of surface releases are due to the presence of the ash disposal pile located in the northern portion of site 4. Higher potential exists for encountering above/belowground structures because the site is located within the 200 East Area waste management area.</p> <p>All sites: From a seismic standpoint, there is little difference between the alternative sites and nothing to significantly affect the design and construction of the Phase I demonstration facilities at any site. Site 4 is the farthest from Gable Mountain and May Junction faults and would be a preferred site if the demonstration plants would be in operation for a prolonged period of time.</p> <p>Sites 2 and 3: These sites are located downwind and away from major population centers in the 200 East Area.</p> <p>Site 4: This site is located adjacent to three major population centers in the 200 East Area: B Plant, PUREX, and the general support area in the southwest corner of the 200 East Area. One of these centers, PUREX, is located downwind in the prevailing wind direction.</p>	<p>2 or 3</p> <p>None</p> <p>2 or 3</p>

Table 4-2. Summary of Site Evaluations. (7 sheets)

Qualitative site selection criteria	Summary of key findings for Alternative Sites 2, 3, and 4	Preferred site
d. Vendor-to-vendor interference	All sites: The net effect of the pro's and con's for each site is that no site was favored over another.	None
e. Siting, infrastructure, and support incompatibility with vendors' operating concepts	Site 3: Close proximity to the AP Tank Farm weighs in favor of this site. This could be offset to some degree if rail service is required directly to the site.	3
f. Siting, infrastructure, and support incompatibility with DOE privatization strategy	Use of the current privatization strategy precludes the use of any one site for both Phase I and Phase II operations. Site 4 is currently planned for siting the Phase II facilities; therefore, on this basis this site could not be used for the Phase I demonstration plants.	2 or 3.

¹Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq.

²Drummond, M. E., 1992, *The Future for Hanford: Uses and Cleanup--The Final Report of the Hanford Site Uses Working Group*, Chaired by M. E. Drummond, President of Eastern Washington University, Cheney, Washington.

³Ecology, EPA, and DOE, 1994, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

ALARA = As low as reasonably achievable

DOE = U.S. Department of Energy

ICF KH = ICF Kaiser Hanford Company

PUREX = Plutonium Uranium Extraction

WHC = Westinghouse Hanford Company

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5.0 CONCLUSION AND RECOMMENDATION

Table 5-1 presents a summary of site evaluation results. The results indicate that Site 3 is the clear choice to locate the TWRS privatization Phase I demonstration facilities. The location and size of Site 3 is expected to (1) accommodate changes in facility sizes or the addition of new facilities (e.g., interim storage of HLW and LLW), and (2) be conducive to whatever processing operations (pretreatment/vitrification) are established for the demonstration facilities.

The recommendation is that the Site 3 area shown in Figure 5-1 be approved for the TWRS privatization Phase I demonstration facilities and that the work efforts proceed on this basis.

Table 5-1. Summary of Site Evaluation Results.

Qualitative site selection criteria	Preferred site
1. Protect the environment	
a. Cultural, archeological, and historical sites	3
b. Ecological	4/3
c. Natural resource damage assessment	4/3
d. Protect the Columbia River and deal realistically and forcefully with groundwater contamination	None
e. Do no harm during cleanup or with new development	3
2. Protect public/worker health and safety	
a. Transport waste safely and be prepared for emergencies	2 or 3
b. ALARA	3
c. Accidents on the privatization site	None
d. Accidents from the privatization site	2 or 3
3. Use the Central Plateau wisely for waste management	4
4. "Get on with the cleanup" to achieve substantive progress in a timely manner. Support meeting the Tri-Party Agreement* schedule.	None
5. Construction Costs	3
6. Operating Considerations	3
7. Flexibility	3
8. Risks	
a. Above/belowground interferences and contamination	2 or 3
b. Seismic	None
c. Site activities	2 or 3
d. Vendor-to-vendor interference	None
e. Siting, infrastructure, and support incompatibility with vendors' operating concepts	3
f. Siting, infrastructure, and support incompatibility with DOE privatization strategy	2 or 3

*Ecology, EPA, and DOE, 1994, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

ALARA = As low as reasonably achievable
DOE = U.S. Department of Energy

6.0 REFERENCES

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7.0 GLOSSARY

ABBREVIATIONS AND ACRONYMS

ALARA	as low as reasonably achievable
DOE	U.S. Department of Energy
HLW	high-level waste
ICF KH	ICF Kaiser Hanford Company
LAW	low-activity waste
LLW	low-level waste
M&O	Management and Operations
OCRWM	Office of Civilian Radioactive Waste Management
PNNL	Pacific Northwest National Laboratory
PUREX	Plutonium-Uranium Extraction
RCRA	Resource Conservation and Recovery Act of 1976
RFP	Request for Proposal
TRU	transuranic
TWRS	Tank Waste Remediation System
WBS	work breakdown structure
WHC	Westinghouse Hanford Company

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APPENDIX A

**PRIVATIZATION SCHEDULE AND TRI-PARTY AGREEMENT
BENCHMARK MILESTONES**

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APPENDIX A
PRIVATIZATION SCHEDULE AND TRI-PARTY AGREEMENT
BENCHMARK MILESTONES

PRIVATIZATION SCHEDULE

Part A

Item	From	To
Technical and Business Demonstration for Low-Activity Waste Solidification	Date of contract award	December 29, 1997
Technical and Business Demonstration for High-Level Waste Vitrification (Option)	Date of contract award	December 29, 1997
Evaluate, Select, and Complete Negotiations for Part B	December 29, 1997	April 30, 1998

Part B (Maximum Schedule)

Item	From	To
Obtain Permit/Complete Design	Date of authorization to proceed with Part B	December 31, 1999
Construction/Testing	December 31, 1999	June 1, 2002
Waste Processing Services for Low-Activity Waste (Minimum Quantities)	June 1, 2002	June 1, 2007
Waste Processing Services for Low-Activity Waste (Quantities in Excess of Minimum)	Completion of minimum quantities	June 1, 2011
Waste Processing Services for High-Level Waste for Minimum Quantity (Option)	June 1, 2002	June 1, 2007
Waste Processing Services for High-Level Waste above Minimum Quantity (Option)	Completion of minimum quantity	June 1, 2011
D&D/RCRA Closure	June 1, 2011	June 1, 2013

D&D = Decontamination and decommissioning
RCRA = Resource Conservation and Recovery Act of 1976

TRI-PARTY AGREEMENT BENCHMARK MILESTONES

Because the Tri-Party Agreement is based on a traditional approach to procurement and operation of facilities, it contains milestones inherent to that approach. Tri-Party Agreement benchmark milestones were based on representation of a substantial, tangible process to site cleanup. The milestones that meet this criterion are as follows.

Milestone	Description	Date
M-50-02	Start hot operations of LLW pretreatment facility to remove Cs and Sr	12-31-04
M-60-05	Initiate hot operations of the LLW vitrification facility*	06-30-05
M-50-04	Start hot operations of HLW pretreatment facility	06-30-08
M-51-03	Initiate hot operations of the HLW vitrification facility	12-31-09
M-45-05	Retrieve wastes from all SSTs	09-30-18
M-45-00	Completion closure of SST farms	09-30-24
M-50-00	Complete pretreatment processing of Hanford tank waste	12-31-28
M-51-00	Complete vitrification of HLW	12-31-28
M-60-00	Complete vitrification of LLW*	12-31-28

*Although the milestones identify vitrification, use of this technology is not required for low-activity waste immobilization under the privatization contract.

HLW = High-level waste
LLW = Low-level waste
SST = Single-shell tank

APPENDIX B

SITE EVALUATION SUMMARIES

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Natalie A. Cadoret

Protect the Environment

Cultural, archaeological, and historic sites: The site shall not have any areas of cultural, archaeological, or historical significance that cannot be reasonably mitigated.

Performance Measurement 1: Presence of archaeological sites that are potentially eligible for inclusion on the National Register of Historic Places (NRHP).

ALTERNATIVE SITE 2	
PRO'S	CON'S
No sites that are potentially eligible for the NRHP have been identified in the area.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
No sites that are potentially eligible for the NRHP have been identified in the area.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
No sites that are potentially eligible for the NRHP have been identified in the area.	None.

Comments: None.

Natalie A. Cadoret

Performance Measurement 2: Potential for subsurface archaeological deposits.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Potential for subsurface archaeological deposits is low.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Potential for subsurface archaeological deposits is low. Much of the area has been disturbed by previous site activities.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Potential for subsurface archaeological deposits is low. The northern part of the area has been disturbed by previous site activities.	None.

Comments: None.

Performance Measurement 3: Historical significance of any existing structures that will be extensively modified or demolished by the Tank Waste Remediation System (TWRS) Phase I demonstration facilities.

ALTERNATIVE SITE 2	
PRO'S	CON'S
No structures have been identified in the area.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Building alteration/demolition unlikely.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Building alteration/demolition unlikely.	None.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 3

No sites that are potentially eligible for the NRHP have been identified in the area. The potential for subsurface deposits is low. Additionally, much of the area has been disturbed by the former Grout Facility operations.

2. Alternative Site 4

No sites that are potentially eligible for the NRHP have been identified in the area. The potential for subsurface deposits is low. The northern part of the area has been disturbed by previous site activities.

3. Alternative Site 2

No sites that are potentially eligible for the NRHP have been identified in the area. The potential for subsurface deposits is low. Little of the area has been disturbed by previous site activities.

Charles A. Brandt

Protect the Environment

Ecological: The site shall not have any areas of ecological impact that cannot be reasonably mitigated.

Performance Measurement 1: Presence/use of area by species protected by the *Endangered Species Act of 1973 (ESA)*.

ALTERNATIVE SITE 2	
PRO'S	CON'S
No ESA species present.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
No ESA species present.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
No ESA species present.	None.

Comments: None.

Performance Measurement 2: Presence/use of area by ESA candidate or Washington State-protected species.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Area is used by loggerhead shrikes (federal and state candidate) and sage sparrows (state candidate), and is habitat for sagebrush lizards and burrowing owls (federal candidates).
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	Sage sparrows (state candidate) and loggerhead shrikes observed in the area in 1994. Area is habitat for sagebrush lizards and burrowing owls (federal candidates).
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	One sage sparrow pair (state candidate) using southeast corner in 1994.

Comments: None.

Charles A. Brandt

Performance Measurement 3: Amount/value of wildlife habitat to be converted to other land use.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Majority of the wildlife habitat is pristine. Baseline maps of habitat quality show this area to be among the highest quality shrub-steppe on the Hanford Site.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Approximately one-third of the area is graveled or denuded; not wildlife habitat.	Perimeter of the area is high-quality shrub-steppe habitat.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Approximately three-fifths of the site is covered by alien weeds or is graveled. Area lies within the 200 Area fence and is designated for development.	Proposed Site 4 will destroy or fragment one of the remaining large patches of priority habitat (late successional shrub-steppe) within the 200 East Area fence.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 4

Site 4 ranks highest with respect to the ecological considerations. Mitigation of habitat loss will be required, but the value of the habitat is less than that for the other two alternatives.

2. Alternative Site 3

Proposed Site 3 ranks intermediate in impact with regard to the performance measurements. Less mitigation will be required than for Site 2, but more than for Site 4.

3. Alternative Site 2

Proposed Site 2 is the poorest alternative with respect to Performance Measurements 1 and 2, and will require the most extensive mitigation.

Charles A. Brandt

The above order of preference assumes TWRS Phase I construction only. Given that it is possible to collocate Phase I and Phase II within Site 4, the order of preference remains the same. If, however, placing Phase I in Site 4 precludes its use by the Phase II production facilities (a much larger impact than Phase I because the Phase II facilities would need to be located elsewhere), the preferred siting option for Phase I is Site 3. In all scenarios, Site 2 is the least preferred siting option.

John A. Hall

Protect the Environment

Natural Resource Damage Assessment (NRDA): The site shall avoid/minimize any impacts to natural resources.

Performance Measurement 1: To avoid/minimize impacts to biological resources, the site must not contain: (1) high-quality wildlife habitat that when impacted will trigger the need for compensatory mitigation, or (2) federal or state listed, candidate, or sensitive species.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Relative to the other alternatives, this site contains the most unfragmented amount of high-quality, late-successional, sagebrush-steppe habitat that is used by species of concern.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Portions of this site are degraded in regard to their wildlife usage value.	Portions of this site (i.e., the perimeter) contain high-quality, late-successional, sagebrush-steppe habitat that is used by species of concern.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Much of the site is degraded in regard to its wildlife usage value.	A portion of the site contains the largest remaining patch of late-successional, sagebrush-steppe habitat remaining within the 200 East Area fence.

Comments: None.

John A. Hall

Performance Measurement 2: To avoid/minimize impacts to groundwater, the site must: (1) not be located over a sole source aquifer, (2) not be above any special protection areas, and (3) conform to any groundwater management area requirements (such as a minimum depth to groundwater of at least 15 m).

ALTERNATIVE SITE 2	
PRO'S	CON'S
The site meets the criterion.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
The site meets the criterion.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
The site meets the criterion.	None.

Comments: None.

Performance Measurement 3: To avoid/minimize impacts to surface water, the site must not be located: (1) in areas subject to flooding, (2) within 152 m of a perennial surface water body, or (3) within 400 m of a surface water supply intake.

ALTERNATIVE SITE 2	
PRO'S	CON'S
The site meets the criterion.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
The site meets the criterion.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
The site meets the criterion.	None.

Comments: None.

Performance Measurement 4: To avoid/minimize impacts to natural resources that have high service values (as related to NRDA claims for the loss of services provided by natural resources), the site must not be located near: (1) unique geologic features, (2) water resources with high human utility value, or (3) biological resources of cultural significance.

ALTERNATIVE SITE 2	
PRO'S	CON'S
The site contains no unique geologic features or water resources that provide significant services.	The site has potentially the highest biological resource service value of any of the alternatives as it is outside the designated waste management areas.
ALTERNATIVE SITE 3	
PRO'S	CON'S
The site contains no unique geologic features or water resources that provide significant services.	The site is intermediate with respect to loss of biological resource service value between Alternatives 2 and 4.
ALTERNATIVE SITE 4	
PRO'S	CON'S
The site contains no unique geologic features or water resources that provide significant services. Because of its location within the 200 East Area fence (an area designated for waste management activities), this site has the lowest biological resource service values of any of the alternatives.	Some loss of biological resource services will occur associated with existence value.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 4

Compensatory mitigation costs are the lowest for this alternative. This alternative would result in the smallest potential loss of natural resource services.

2. Alternative Site 3

This alternative is intermediate in regard to compensatory mitigation costs and loss of natural resource services.

3. Alternative Site 2

Compensatory mitigation costs are the highest for this alternative. This alternative would result in the highest potential loss of natural resource services.

The above order of preference assumes TWRS Phase I construction only. Given that it is possible to collocate Phase I and Phase II within Site 4, the order of preference remains the same. If, however, placing Phase I in Site 4 precludes its use by the Phase II production facilities (a much larger impact than Phase I because the Phase II facilities would need to be located elsewhere), the preferred siting option for Phase I is Site 3. In all scenarios, Site 2 is the least preferred siting option.

Stuart P. Luttrell/Darrell R. Newcomer

Protect the Environment

Protect the Columbia River and deal realistically and forcefully with groundwater contamination: Ability of the site to meet federal, state, and local requirements for the protection of groundwater. Factors are (1) impact of previous Hanford Site practices (liquid effluent discharges, single-shell tank leaks, disposal actions) on groundwater under site, (2) hydrology of site, and (3) impact of site on proposed future Hanford Site disposal operations (e.g., LLW disposal).

Performance Measurement 1: Presence of groundwater contamination from previous Hanford Site practices.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	<ul style="list-style-type: none">Groundwater is contaminated above U.S. Environmental Protection Agency (EPA) drinking water standards.Downgradient (in the future) from 200 West Area.
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	<ul style="list-style-type: none">Groundwater is contaminated above EPA drinking water standards.Downgradient (in the future) from 200 West Area.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	<ul style="list-style-type: none">Groundwater is contaminated above EPA drinking water standards.Downgradient (in the future) from 200 West Area.

Comments: Groundwater contamination, primarily from the Plutonium-Uranium Extraction (PUREX) cribs is present beneath the three sites. The sites will likely eventually be downgradient of 200 West Area contaminant plumes, given the groundwater flow paths predicted for future conditions. This contamination should not impact construction or operation because another source of water will be required for construction and consumption. Depth to groundwater is >50 m under all three sites.

This performance measurement was not considered to be a significant discriminator for rating purposes.

Stuart P. Luttrell/Darrell R. Newcomer

Performance Measurement 2: Known acceptable groundwater pathways and travel times to the Columbia River as determined by the hydrology of the sites.

ALTERNATIVE SITE 2	
PRO'S	CON'S
<ul style="list-style-type: none"> Hydrogeologic setting is fairly well understood. Groundwater gradient is large so it can be determined with high certainty. Groundwater travel time is expected to be similar for all three sites. 	<ul style="list-style-type: none"> Groundwater flow direction will change significantly in the next several years, which makes it more difficult to assess pathways.
ALTERNATIVE SITE 3	
PRO'S	CON'S
<ul style="list-style-type: none"> Hydrogeologic setting is fairly well understood. Groundwater gradient is large so it can be determined with high certainty. Groundwater travel time is expected to be similar for all three sites. 	<ul style="list-style-type: none"> Groundwater flow direction will change significantly in the next several years, which makes it more difficult to assess pathways.
ALTERNATIVE SITE 4	
PRO'S	CON'S
<ul style="list-style-type: none"> Hydrogeologic setting is fairly well understood. Groundwater flow direction will remain fairly constant in the future. Groundwater travel time is expected to be similar for all three sites. 	<ul style="list-style-type: none"> Groundwater gradient is small, so it cannot be determined with high certainty.

Comments: The hydraulic gradient is important in determining groundwater pathways and travel times to the Columbia River. The direction of the gradient in the vicinity of Sites 2 and 3 will change for a number of years in the future as a result of reduced waste water discharges and the decay of the mound caused by discharges to B Pond. This change in the gradient is not expected to affect the ultimate pathways and travel times to the Columbia River.

The Phase 1 facilities will have no land-based units as defined under RCRA, and are expected to have no impact on groundwater. Groundwater monitoring will not be required.

This performance measure was not considered to be a significant discriminator for rating purposes.

Stuart P. Luttrell/Darrell R. Newcomer

Performance Measurement 3: No impact on proposed use plans of the Hanford Site.

ALTERNATIVE SITE 2	
PRO'S	CON'S
No expected impacts.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
No expected impacts.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
No expected impacts.	None.

Comments: The facility will have no land-based disposal units as defined under RCRA and is therefore not expected to have an impact on groundwater or future use plans related to groundwater. Groundwater monitoring will not be required.

This performance measurement was not a significant discriminator for rating purposes.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

No preferred order is given for these site selection criteria.

Groundwater contamination is present beneath the three sites. This contamination should not impact construction or operation because another source of water will be required for construction and consumption. Depth to groundwater is >50 m under all three sites.

The groundwater pathways and travel times to the Columbia River are expected to be similar for all three sites.

The facility will have no land-based disposal units as defined under RCRA and is therefore not expected to have an impact on groundwater or future use plans related to groundwater. Groundwater monitoring will not be required.

These performance measurements were not significant discriminators between the sites for rating purposes.

Protect the Environment

Do no harm during cleanup or with new development: The establishment of the privatization site shall minimize the impact to the environment.

Performance Measurement 1: Site is not impacted by the environment, for example:

- Previously disturbed site with little or no possibility of encountering contamination
- Existing environmental data minimizes acquisition of site baseline data
- Site has least possibility of pollution migration from proximal operations and waste sites
- Not adversely impacted by expansion.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Room for expansion to the east if needed.	<ul style="list-style-type: none"> • Site has not been characterized for potential radiological contamination • Full site characterization requires 2 years • Feed lines would have to bypass contaminated areas; could require more extensive transfer pipeline
ALTERNATIVE SITE 3	
PRO'S	CON'S
<ul style="list-style-type: none"> • No surface radiological contamination is known in this area • Site has been characterized as the former Grout Site which could save considerable resources during vitrification project characterization 	This site is bounded on three sides by old waste sites.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Area has low contamination potential.	<ul style="list-style-type: none"> • The coal ash pile would need to be remediated before construction • Site is being considered for Phase II • Site would require more substantial characterization than Site 3

Comments: None.

Performance Measurement 2: Site has minimal impact on the environment, for example:

- Construction and operations should minimize wildlife habitat destruction and loss
- Facility potential for release of liquid or gaseous effluents has minimal impact on the environment
- Existing infrastructure does not require new roads, fences, and transfer lines to disrupt wildlife habitat
- Proximity to feed sources so transfer lines do not require impact to large acreage.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	<ul style="list-style-type: none"> • Site is farther away from the AP Tank Farm • There is some potential for pollution migration • This site would require the greatest habitat destruction, and therefore more extensive mitigation
ALTERNATIVE SITE 3	
PRO'S	CON'S
<ul style="list-style-type: none"> • Contamination has been evaluated in this area • Site is close to feed source • Much of the required infrastructure (i.e., service roads and cyclone fencing) is already in place • Existing berm provides barrier between facilities • Site development would require the least undisturbed habitat to be destroyed 	Some habitat destruction would occur requiring mitigation.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Contamination has been evaluated in this area.	This site would require the destruction of the second largest amount of habitat.

Comments: None.

Performance Measurement 3: Environmental protection data available, for example:

- Specific regulatory compliance criteria completed
- Preoperational environmental monitoring survey completed.

ALTERNATIVE SITE 2	
PRO'S	CON'S
This site is outside the radiologically controlled area, and outside the 200 East Area fence.	There is very little environmental data available for this site.
ALTERNATIVE SITE 3	
PRO'S	CON'S
A substantial amount of environmental data has been collected for this site during the Grout Project studies.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Substantial environmental characterization data are needed.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 3

From a preceding environmental review of this site, it appears to be acceptable for Phase I, and it avoids collocating Phase I and Phase II facilities. The site is within a fenced controlled area. Significant environmental studies have been conducted during the Grout Project characterization at this location which will assist in minimizing pre-operational requirements. Available data describe surface and subsurface contamination, including groundwater. Existing contamination should not need to be remediated before construction of Phase I. A mature sagebrush community would be impacted, but mitigation would be less than at Sites 2 and 4.

2. Alternative Site 4

This site is within a radiological controlled area (200 East Area), and is being considered for Phase II construction activities. However, there may not be sufficient room for Phase I activities. The coal ash pile, and encompassing zone, would require remediation before any new construction in the area. The remediation work would need to be taken into consideration relative to the overall project schedule.

3. Alternative Site 2

This site has not yet been characterized, and data are not available. The site feasibility process could take anywhere from 1 to 2 years. Feed lines from 241-AP would have to bypass existing waste sites. Significant habitat destruction would require extensive mitigation if this site is selected.

OVERALL SUMMARY

The site preferences are based on environmental protection, habitat destruction, potential impact on the new facilities from neighboring waste sites, existing infrastructure, and proximity to the feed source. Based on these performance measurements, Site 3 is most preferred, followed by Site 4, and lastly, Site 2.

Siting criteria and evaluations of the alternative sites should be included in the TWRS Environmental Impact Statement to sufficiently address land use in the affected environment.

Jay C. Lavender

Protect Public/Worker Health and Safety

Transport waste safely and be prepared for emergencies: Minimize the transportation of radioactive and hazardous waste and material through populated areas.

Performance Measurement 1: A qualitative assessment of the potential impacts to the public and onsite worker during normal feed transfer operations from the proposed staging tanks located in the AP Tank Farms (200 East Area).

ALTERNATIVE SITE 2	
PRO'S	CON'S
1,000 m from AP Farm Complex.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
1,000 m from AP Farm Complex.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	1,500 m from AP Farm Complex.

Comments: None.

Jay C. Lavender

Performance Measurement 2: A qualitative assessment of the potential impacts to the public and onsite worker during normal transfer of product within the site.

ALTERNATIVE SITE 2	
PRO'S	CON'S
In site transportation routes away from occupied facilities.	Site layout may not accommodate locating demonstration and interim storage facilities adjacent to each other.
ALTERNATIVE SITE 3	
PRO'S	CON'S
In site transportation routes away from occupied facilities. Site layout may accommodate locating demonstration and interim storage facilities adjacent to each other.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
In site transportation routes away from occupied facilities. Site layout may accommodate locating demonstration and interim storage facilities (using common storage areas) adjacent to each other.	None.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Sites 2 and 3

Sites 2 and 3 are located away from other occupied facilities. Therefore transportation of waste and product impacts to onsite workers would be minimized. The location of the sites with respect to the AP Tank Farm are approximately the same and when compared to Site 4 would represent a lower risk (see overall evaluation).

2. Alternative Site 4

Site 4 is farther away from the AP Tank Farm than Sites 2 and 3. A direct transfer line from the AP Tank Farm to this site may pass by the 242-A Evaporator and the AW Tank Farm, increasing the risk to onsite

Jay C. Lavender

individuals. Constructing a line that would bypass these facilities would increase the transfer distances, thereby increasing the risk to onsite individuals.

OVERALL SUMMARY

The results of the qualitative assessment of the potential impacts to the public and onsite worker during normal feed transfer operations from the proposed staging tanks located in the AP Tank Farms (200 East Area) indicate that the consequences associated with a release during waste transfer operations remain relatively constant. That is, assuming the source strength remains constant, irrespective of where the pipe failure may occur, the dose received by the maximally exposed individual would be approximately the same. The potential for pipeline failures increases with distance; therefore, as the transfer distance increases, there is an associated increase in risk (probability of pipe failure multiplied by consequences). The pipeline is encased and buried. Potential impacts because of a release would be limited to the soil column. However, impacts to workers would be increased near diversion boxes, valve pits, vent stations, etc. The distances used to evaluate the performance measurement were determined using central locations for the facilities.

The demonstration facilities and the interim storage area locations within the site are not 'fixed' at the time of this study; therefore, impacts to either onsite or offsite individuals during transportation of the product cannot be accurately assessed. As described in the preceding paragraph, the greater the travel distance the greater potential for a transportation accident. Therefore, the alternatives were evaluated based on their potential for locating the storage facilities adjacent to the interim facilities. Although Sites 3 and 4 may accommodate locating the demonstration and interim storage facilities adjacent to each other, this may not be feasible with multiple vendors. In summary, for these criteria, the potential impacts for each site are roughly the same.

Jay C. Lavender

Protect Public/Worker Health and Safety

As low as reasonably achievable (ALARA): The site shall minimize the adverse affects on the health and safety of personnel. The concept of reducing the exposure of workers to radiological and hazardous substances to ALARA principles will be considered.

Performance Measurement 1: A qualitative assessment of the potential impacts during construction and normal operations to personnel located in facilities adjacent to the site (includes radiological and chemical hazards).

ALTERNATIVE SITE 2	
PRO'S	CON'S
Site is located away from areas of high onsite traffic.	Site is located adjacent to Route 4 and Canton Avenue.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site is located away from areas of high onsite traffic.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Because of the site layout, portions of the complex will be located in existing areas of high onsite traffic (4th Street, Baltimore Avenue and adjacent to Route 4). A coal ash pile is located on this site. Removal would entail some risk to personnel and require work protection.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 3
See overall summary.
2. Alternative Site 2
See overall summary.
3. Alternative Site 4
See overall summary.

OVERALL SUMMARY

It is assumed that occupational doses from chemical and radiological sources used during normal operations will be approximately the same for each site. The location of the demonstration and interim storage facilities within each of the alternates is not 'fixed' at the time of this study. It is reasonable to assume the greater the travel distance and exposure time, the higher occupational dose. That is, although the exposure rate from each canister may be low, the total dose received is accumulative.

In addition, it is desirable to locate the facilities away from, and not cross, areas of high traffic. This includes onsite (i.e., within the 200 East Area) and adjacent traffic (i.e., Route 4). In summary, for these criteria, the potential impacts for each site are roughly the same; however, Site 3 appears to be the most desirable.

The construction risks associated with all sites are essentially the same with the exception of Site 4. Site 4 contains a coal ash pile. Removal of the coal ash pile would entail some risk to personnel and require worker protection.

Protect Public/Worker Health and Safety

Accidents on the privatization site: Minimize the effects of possible accidents at adjacent facilities on the privatization site.

Performance Measurement 1: Potential accident dose from facilities adjacent to the site.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	The major facilities within the prevailing wind corridor that could significantly impact the TWRS privatization facilities because of an accidental release are the BY, AN, AZ, AX, AY, AW, and AP Tank Farms; 242-A Evaporator; and the Waste Encapsulation and Storage Facility (WESF).
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	The major facilities within the prevailing wind corridor that could significantly impact the TWRS privatization facilities because of an accidental release are the BY, AN, AZ, AX, AY, AW, and AP Tank Farms; 242-A Evaporator; and WESF.
ALTERNATIVE SITE 4	
PRO'S	CON'S
The 242-A Evaporator and the AN, AZ, AX, AY, AW, and AP Tank Farms are located out of the prevailing wind corridor.	The major facilities within the prevailing wind corridor that could significantly impact the complex because of an accidental release are the B, BX, and BY Tank Farms and WESF.

Comments: None.

Jay C. Lavender

Performance Measurement 2: Potential accident dose from pipelines adjacent to the site.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Facility not located near proposed or existing transfer lines.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Facility not located near proposed or existing transfer lines.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Replacement cross-site transfer line is in close proximity to the northern boundary of the Site.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

There is no preferred alternative site (see overall summary).

OVERALL SUMMARY

It was assumed that before startup of the immobilization and vitrification facilities, decontamination and decommissioning (D&D) or source reduction activities at the transition facilities (e.g., PUREX and B Plant) should be completed; therefore, impacts associated with an accidental release from a facility currently in transition or D&D were not included in the evaluation. Also, based on the potential hazards associated with a release from the cross-site transfer line, all transfer line leaks were assumed to be bounded by a failure of the replacement cross-site transfer line.

Prevailing wind is from the west and northwest (wind corridor); therefore, an accident at any facility within this wind corridor could impact operations. Because the locations of some of the alternate sites occupy roughly the same general area within the 200 East Area (e.g., 2 and 3) or in the same wind direction the impacts from other facilities are approximately the same. The potential for Site 4 to be impacted by operations in the 242-A Evaporator and the A Tank Farms is reduced, i.e., these facilities are outside the prevailing wind corridor. However, the northern boundary of Site 4 is near the replacement cross-site transfer line and would be impacted should this line fail. In summary, the potential impacts for each site, based on the performance measures, are roughly the same.

Jay C. Lavender

Protect Public/Worker Health and Safety

Accidents from the privatization site: Minimize the effects of possible accidents at the privatization site and its associated facilities (e.g., transfer lines) on adjacent facilities.

Performance Measurement 1: Potential accident dose to the onsite worker from the facilities or operations.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Prevailing winds are from the west and northwest. There are no facilities located adjacent to the facility in the east-southeast direction.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Prevailing winds are from the west and northwest. There are no facilities located adjacent to the facility in the east-southeast direction.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
If the demonstration and interim storage facilities are located at the south end of the site, the same argument used for Sites 2 and 3 remains valid.	If the demonstration and interim storage facilities are located at the north end of the site, there is a potential to impact the AW and AP Tank Farms and the 242-A Evaporator.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 2 and 3

Based on the argument of prevailing wind directions, accidental releases from these sites would not impact adjacent facilities (the nearest facility is the Fast Flux Test Facility).

Jay C. Lavender

2. Alternative Site 4

Based on the argument of prevailing wind directions, accidental releases from these sites could impact adjacent facilities (AW and AP Tank Farms and 242-A Evaporator).

OVERALL SUMMARY

The facility locations within the site are not identified at the time of this study; therefore, it is assumed that the facilities are located at the site boundary in the least favorable location.

Prevailing wind is from the west and northwest (wind corridor); therefore, an accident could impact operations at adjacent facilities located downstream from the facility. Although the doses will be below the Westinghouse Hanford Company risk guidelines, those alternate sites (2 and 3) located to the east and south of the 200 East Area are more favorable because there are no facilities in the 200 Area downstream of the sites.

For all alternative site locations, should an accidental release occur with the wind blowing from the east or south, there is the potential to impact the health of personnel in facilities to the north or west of the sites. This includes, for example, the 2750 Building, 2101M, 272-AW, 242-A Evaporator, etc. This also applies to routine releases; however, routine releases will be below established guidelines.

Use the Central Plateau Wisely for Waste Management

Land use planning: The site shall be in concert with future land use objectives and remediation strategies being established for the Central Plateau. The documents that will guide land use planning for the Site include a Hanford Site strategic plan, a Hanford Site remedial action environmental impact statement, and a Hanford Site comprehensive land use plan. These documents will be finalized in FY 1996. In the interim, the *Hanford Site Development Plan* (RL 1994), the *Hanford 200 Areas Development Plan* (Rinne and Daly 1993), and *The Future for Hanford: Uses and Cleanup--The Final Report of the Hanford Future Site Uses Working Group* (Drummond 1992) provide the following recommendations for land use planning on the Central Plateau.

- Waste management, storage, and disposal activities should be concentrated within the 200 Areas whenever feasible to minimize the amount of land devoted to, or contaminated by, waste management activities. When bringing wastes to the area, adverse effects should be minimized, especially to currently uncontaminated areas of the Central Plateau.
- The waste management area would encompass the 'squared off' boundaries of the current 200 East and West Areas.
- The remainder of the Central Plateau, including the 200 North Area, that encircles the waste management area would be designated a 'buffer' area to reduce the risks that are expected to continue to emanate from the waste management area. The boundary of the buffer area will shrink as the risks are reduced.

Performance Measurement 1: The optimum site shall be located inside the current fence line of the 200 East Area.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Located outside current boundary of 200 East Area.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Inside Grout extension. Site was previously set aside for Grout Disposal Site and disturbed for construction of Grout vaults.	Located outside current boundary of 200 East Area.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Located inside current boundary of 200 East Area.	None.

Comments: None.

Edward F. Yancey

Performance Measurement 2: The optimum site shall minimize the disturbance of clean land.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	This site is the most pristine of all the alternative sites.
ALTERNATIVE SITE 3	
PRO'S	CON'S
This site has been somewhat disturbed by construction activities associated with the Grout Treatment Facility.	This site is in a relatively clean area.
ALTERNATIVE SITE 4	
PRO'S	CON'S
This site has been somewhat disturbed by the 200 East Area powerhouse ash pit and Grout Dry Materials Receiving and Storage Facility.	This site is in a relatively clean area.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 4

Alternative site 4 is the only site that is completely located inside the current fence boundary of the 200 East Area. All the alternatives are relatively clean areas. The difference with Site 4, however, is the 200 East Area powerhouse ash pit (receives nonhazardous and nonradioactive ash) and Grout Dry Materials Receiving and Storage Facility are both located inside the site's boundary.

2. Alternative Site 3

Inside Grout extension. Site was previously set aside for Grout Disposal Site and disturbed for construction of Grout vaults.

3. Alternative Site 2

Located outside the current 200 East Area fence line and in relatively clean area.

John D. Galbraith/Carole E. Leach

Construction - Cost

1. Utilities: Installation/upgrade costs of electricity, raw water, sanitary water, steam, and telecommunications. Considers existing and planned utilities.
2. Rail/roads: Installation/upgrade costs of rail and roads.
3. Waste transfer lines: Installation costs of waste transfer line from the 241-AP Tank Farm to the privatization sites.
4. Liquid effluent disposal: Installation of liquid effluent disposal lines from the privatization site to the liquid effluent disposal system.
5. Construction proximity: The ability to locate temporary construction support facilities close to the facilities being constructed and the availability of adequate laydown and construction support areas.
6. Construction commonality: Maximum use of common construction support needs (e.g., laydown areas, utilities, parking, batch plant, offices, shops, warehouses, change rooms, etc.) between projects or construction phases of multiple facilities of the same project.
7. Site preparation: Costs associated with earth-moving activities necessary to complete construction. Includes topography, site irregularities, finish grade elevation, and removal/relocation of existing structures.

Performance Measurement 1a: Distance from the centroid to the nearest acceptable electrical tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
See comments.	See comments.

Comments: All three sites are essentially equal. Considered were:
(1) PUREX electrical supply system upgrade, and (2) direct tie-in to supply grid.

John D. Galbraith/Carole E. Leach

Performance Measurement 1b: Distance from the centroid to the nearest acceptable raw water tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Water tie-in point assumed to be just adjacent to Canton Avenue.	Requires longer piping distance than Site 4.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Same as Site 2.	Same as Site 2.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Water tie-in point assumed to be adjacent to 4th St. Site 4 is best in this regard.	None.

Comments: This item is not considered to be a driving discriminator.

Performance Measurement 1c: Distance from the centroid to the nearest acceptable sanitary water tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Water tie-in point assumed to be just adjacent to Canton Avenue.	Requires longer piping distance than Site 4.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Same as Site 2.	Same as Site 2.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Water tie-in point assumed to be adjacent to 4th St. Site 4 is best in this regard.	None.

Comments: This item is not considered to be a driving discriminator.

John D. Galbraith/Carole E. Leach

Performance Measurement 1d: Distance from the centroid to the nearest acceptable steam tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
See comments.	See comments.

Comments: It is assumed that site supply steam will not be available for delivery to the private vendors. The 200 East Steam Plant is assumed to have been deactivated or shutdown by 1998. Facilities requiring steam will provide their own via standalone packaged steam units.

Performance Measurement 1e: Distance from the centroid to the nearest acceptable telecommunications tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4 is the best because the telecommunications trunk traverses the site.	None.

Comments: Telecommunications hookup for Sites 2 and 3 is assumed to come off Canton Avenue. This item is not considered to be a driving discriminator.

John D. Galbraith/Carole E. Leach

Performance Measurement 2a: Distance from the centroid to the nearest acceptable railroad tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Railroad service to Sites 2 and 3 would require extension of the existing spur at Mays Junction. Routing would likely involve traversing the Grout Site Plateau. This involves significant elevation increase (i.e., railroad trestle would be required). Extension of the PUREX/204-AR spur would involve negotiations around and in congested areas, if at all feasible.
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	Same as Site 2.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4 is the best because a railroad spur currently runs adjacent to the north boundary of Site 4.	None.

Comments: This is considered to be a site discriminator in favor of Site 4 if it is established that rail is essential. If not, this is no longer a discriminator and road access needs to be examined (2b).

John D. Galbraith/Carole E. Leach

Performance Measurement 2b: Distance from the centroid to the nearest acceptable road/highway tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
See comments.	See comments.

Comments: All three sites are essentially equal in this regard.

John D. Galbraith/Carole E. Leach

Performance Measurement 3: Distance from the centroid to the nearest acceptable waste transfer line tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Site 2 would require routing waste transfer lines south along Canton Avenue from the AP Farm to the vendor sites. This is required to avoid existing cribs/trenches.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site 3 is better than Sites 2 and 4 assuming that AP Farm tanks are used as the vendor feed tanks. Transfer lines would be routed from AP, due east to vendor sites (approximately 610 m [2,000 ft]).	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Site 4 would require a tie-in point in the AN Tank Farm. Dedicated routing to Site 4 would likely run west from the AN Tank Farm along the cross-site transfer route and then turn south into the site. (The possibility of the availability of the new cross-site transfer system is not addressed here.)

Comments: None.

John D. Galbraith/Carole E. Leach

Performance Measurement 4: Distance from the centroid to the nearest acceptable liquid effluent tie-in point.

ALTERNATIVE SITE 2	
PRO'S	CON'S
The Liquid Effluent Treatment Facility transfer system runs adjacent to Canton Avenue and terminates at the 242-A Evaporator. It is assumed that the existing line is of sufficient size to handle the Phase I effluent transfer requirements. Site 3 is slightly favored over Site 2 due to piping length requirements.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site 3 is slightly favored over Site 2.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4 would require northbound piping to tie into the 200 East Area liquid effluent piping system (just north of existing PUREX railroad spur). Site 4 is favored over Site 3.	None.

Comments: • This item is not considered to be a driving discriminator.

- Any sanitary waste generated by the vendor will be managed and disposed of by the vendor in accordance with applicable federal, state, and local laws and regulations. With respect to any concern regarding further transport of hazardous/radioactive contamination already in the soil: (1) the sites are located to the east and downgradient from all contaminated areas, and (2) any sanitary effluent would not penetrate much into the vadose zone. Also septic systems can be engineered, if necessary, to provide high-purity water.

John D. Galbraith/Carole E. Leach

Performance Measurement 5: Distance from areas available for construction laydown and the location of the Phase I vendor facilities.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Sites 2 and 3 are adequate and essentially equal in this regard.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Sites 2 and 3 are adequate and essentially equal in this regard.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4, because it is considerably larger than Sites 2 and 3, allows greater space and flexibility for construction activities. This could be of significant value if concurrent construction involving two competing vendors is expected in the same general area. The more room, the better.	None.

Comments: None.

John D. Galbraith/Carole E. Leach

Performance Measurement 6: Availability of support facilities and infrastructure that can service two or more vendors during construction.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Availability of railroad service directly to site.	See comments.

Comments: None of the three sites have any unique features with respect to each other in this regard. A possible exception is the availability of railroad service to Site 4. This item highly depends on the nature of the materials that a vendor brings to the site. Large, heavy, pre-assembled items could be transported via the existing Hanford Site railroad system which is connected to commercial rail. This item cannot be fully evaluated without knowledge of vendor design and construction concepts.

John D. Galbraith/Carole E. Leach

Performance Measurement 7: Determine the relative degree of uneven topography and existing structures.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	<p>Site 2 may require more earth movement than Sites 3 and 4 for site preparation because of the more uneven site topography.</p> <p>Site 2 is the least favorable site in this regard.</p>
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site 3 is best in this regard.	<p>Will require some earth moving to smooth/level out site topography.</p> <p>May require grade work (filling in the vault excavation) around the area of the Grout Vaults.</p>
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	<p>Will require some earth moving to smooth/level out site topography. Site 4 may require the removal of the power plant fly ash pile and the Dry Materials Receiving and Handling Facility.</p> <p>Site 4 is better than Site 2 but not as good as Site 3 in this regard.</p>

Comments: None.

John D. Galbraith/Carole E. Leach

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 3

As with Site 2, this site is not advantageous if rail service is important. This is the most favorable site from the standpoint of installation of underground waste transfer lines connecting the vendor facilities to the AP Tank Farm. If rail service is not an issue and if there is no possibility that the site waste transfer infrastructure planned for Phase II (Project W-058) could be available for Phase I, Site 3 is the best site for this category of evaluation criteria.

2. Alternative Site 4

Site 4 is the most advantageous from a number of standpoints; however, its strongest detractor is the difficulty in providing underground waste transfer line connection to the AP Tank Farm. (No consideration is given in this evaluation to the possibility of using a new cross-site transfer system as a Phase I connection between the AP Tank Farm and Site 4. Note that such a connection is certainly assumed for Phase II which is presently planned to be located on Site 4.) Other than the waste transfer issue, Site 4 is equal to or better than Sites 2 and 3 in all other respects. There is more room for construction activities and sufficient space for separation between competing vendors. A point should be made, however, that a strategy that uses multiple vendors could not collocate Phase I (demonstration) and Phase II (production) facilities in any one site. In some cases, there is better access to utilities. Finally, there is a practical opportunity to take advantage of the railroad spur which is located right at the north boundary of Site 4.

3. Alternative Site 2

If the vendors' construction and operating concepts rely on or benefit greatly from the availability of railroad service, Site 2 is not advantageous. There will be some difficulty in the provision of underground waste transfer lines connecting the AP Tank Farm to vendor facilities on Site 2. Site 2 is the least favorable from the standpoint of the amount of earth movement that would have to be done to make the site suitable for construction of processing facilities.

Operating Considerations

1. Ease of waste transfer: Operating costs between the various sites shall be qualitatively assessed and shall include items such as facility and feed/waste transfer costs (flushing, dilution of waste, concentration of diluted waste [evaporation of waste to manage double-shell tank space], line drain back, etc.). The potential for transfer line plugging should be minimized to the extent possible. Factors to be considered should include waste transfer system configuration (i.e., number of process pits), line traps, quantity of flush water after each transfer, line drain back to low point, number of low points in system, dilution requirement to mitigate plugging of transfer system, pumping requirements (minimize the use of pump booster stations), and siphoning effect between the shipping location and the processing facilities. In essence, the intertank/facility piping should be free draining (to the extent practical) to the transfer destination.
2. Proximity to assigned vendor feed tanks: The distance between the privatization site and the double-shell feed tanks in the 241-AP Tank Farm shall be kept to a practical minimum.

John D. Galbraith/Carole E. Leach

Performance Measurement 1: Ease of waste transfer.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Site 2 has transfer line provision issues as well as hydraulic concerns.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site 3 is most advantageous from the standpoint of waste transfer line provision. Preliminarily, it is expected that this site is also the best from the perspective of transfer line hydraulics and flush volumes.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Unless it is assumed that Phase I can benefit from a significant upgrade in site transfer capability (e.g., Project W-058 installed and connected to Site 4), this site represents the worst case from the standpoint of dedicated connection to AP Tank Farm. Hydraulics and flushing would be of greater concern than that of Site 3, but perhaps better than Site 2.

Comments: None.

John D. Galbraith/Carole E. Leach

Performance Measurement 2: Proximity to assigned vendor feed tanks.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Site 2 is close to the AP Tank Farm but would require routing the transfer lines around existing structures (i.e., contaminated cribs). The hydraulic of any feasible routing which avoids structures and contamination has not been evaluated. Therefore, this criterion cannot be fully evaluated as part of this exercise.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site 3 is clearly the best for proximity to the proposed vendor feed tanks (AP Tank Farm). The connection is considered to provide the least uncertainty for routing, hydraulics, and flushing volumes.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Site 4 is the least desirable of the three proposed sites due solely to the distance from the AP Tank Farm. The transfer route from AP through the A Farm Complex is the most torturous and the most lengthy.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 3

This site is located to the east of the shutdown Grout Facility. To route lines to the vendors is not expected to be a difficult task. The current site elevations appear to support providing good transfer line hydraulics.

John D. Galbraith/Carole E. Leach

2. Alternative Site 2

This site is located to the south of the AP Tank Farm. In the vicinity of this site, there are contaminated cribs. Routing transfer lines to this site would require the circumvention of cribs. At this time, the hydraulics of such a routing have not been fully evaluated. There is a possibility that transfer line hydraulic issues could impact portions of the vendor processing site design. Specifically, it is possible that the vendor may need to be able to handle transfer line volume drain back. This would imply the need for the vendor to provide processing site tankage of sufficient volume to handle drain back.

3. Alternative Site 4

This site is located to the west of the PUREX processing facility, which is being decommissioned. To connect this site to the A Farm Complex transfer system, it would be necessary to route lines to the 244-A Lift Station, or the AN Tank Farm, or tie into the new cross-site transfer system (if available to support the Phase I schedule). All these options require more evaluation. The site is also a substantial distance from the A Farm Complex which will influence the hydraulics of the transfer system, flush volumes, and cost of installation.

Flexibility

Site Expansion: Adequate expansion area should be available for future privatization options. More potential expansion area is preferable to less.

The land area requirement evaluation indicates that each vendor site needs to be at least 4 ha (10 acres). This amount of land appears to be reasonable when compared with similar projects. Additional land may be required for items such as:

- Proposed roads/rail and utility corridors
- Contractor support facilities and construction worker parking
- Construction laydown areas
- Land requirements that have not been identified at this time.

Experience has shown that land requirements increase as a project develops and as additional requirements are identified. It is recommended that additional land be reserved to allow for future expansion flexibility to accommodate unidentified future land area requirements, including but not necessarily limited to, road/rail and utility corridors.

The rough rule of thumb is to double the amount of land initially required; therefore, 8.1 ha (20 acres) should be reserved for each Phase I plant site for a total land area requirement of 16.2 ha (40 acres). Site 1 was eliminated from further consideration and evaluation because it did not meet the minimum area requirements.

Specific performance measurement(s).

1. The optimum site shall have adequate expansion capability.
2. Relative size of alternative site (a larger site is better than a smaller site).
3. Would future expansion be easy or are there potential interferences that would make future expansion difficult?

E. Ted Trost

Performance Measurement 1: The optimum site shall have adequate expansion capability.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Site 2 consists of about 45 ha (110 acres) which provides adequate expansion capability.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site 3 consists of about 53 ha (130 acres) which provides adequate expansion capability.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Site 4 has been reserved for Phase II facilities.

Comments: None.

Performance Measurement 2: Relative size of alternative site (a larger site is better than a smaller site).

ALTERNATIVE SITE 2	
PRO'S	CON'S
This site would have more land available than Site 4.	This site is smaller than Site 3.
ALTERNATIVE SITE 3	
PRO'S	CON'S
This site has the most usable land.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Site 4 has been reserved for Phase II facilities. Future expansion would be difficult.

Comments: None.

E. Ted Trost

Performance Measurement 3: Would future expansion be easy or are there potential interferences that would make future expansion difficult?

ALTERNATIVE SITE 2	
PRO'S	CON'S
The potential exists to expand to the east, if required, and if the necessary approvals were obtained.	Expansion to the south is limited by Route 4S; expansion to the north is limited by crib 216-A-30; expansion to the west is limited by Canton Avenue.
ALTERNATIVE SITE 3	
PRO'S	CON'S
The potential exists to expand to the north, south, and east, if required, and if the necessary approvals were obtained.	Expansion to the west is limited by Grout Facilities and tank farms.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Site 4 has been reserved for Phase II facilities. Future expansion would be difficult.

Comments: None.

E. Ted Trost

Flexibility

Access: Ease of access to the privatization site.

Specific performance measurement(s):

1. Ease of access to primary road
2. Ease of access to railroad spur
3. Ease of access to AP Tank Farm
4. Ease of access for general utilities like water, electrical, and telecommunications.

Performance Measurement 1: Ease of access to primary route.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Site 2 is located next to Route 4S.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	Site 3 is located farther from Route 4S than the other two sites.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4 is located next to Route 4S.	None.

Comments: None.

E. Ted Trost

Performance Measurement 2: Ease of access to railroad spur.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Rail access to Site 2 would be fairly difficult and would probably be located south of the PUREX tunnel.
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	Same disadvantage as for Site 2, except the rail spur would have to be longer.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4 is located next to the existing PUREX rail spur.	None.

Comments: None.

Performance Measurement 3: Ease of access to AP Tank Farm.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Site 2 is located closer to the AP Tank Farm than Site 4.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Site 3 is located about the same distance from the AP Tank Farm as Site 2.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Site 4 is located the farthest from the AP Tank Farm.

Comments: None.

E. Ted Trost

Performance Measurement 4: Ease of access for water, electrical, and telecommunications.

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	Site 2 is located farther from utilities than Site 4.
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	Site 3 is located about the same distance from utilities as Site 2.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4 is the closest to existing Utilities.	None.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 3

Constructing the TWRS Phase I Complex at Site 3 offers the least constraints with existing and planned Phase II facilities. Site 3 consists of 53 ha (130 acres) and offers the most flexibility for future expansion. Rail access, if required, would be more difficult but this disadvantage should be more than offset by the site being located close to the AP Tank Farm.

2. Alternative Site 2

Site 2 consists of about 45 ha (110 acres) which would probably be sufficient with respect to future expansion capability. This site is located relatively close to the AP Tank Farm but farther from utilities. Rail access to this site also would be more difficult.

3. Alternative Site 4

Site 4 would have been the best location for the Phase I plants if this site had not already been reserved for the Phase II facilities. This site is located close to all infrastructure but farther from the AP Tank Farm.

Robert G. Riley

Risks

Above/belowground interferences and contamination: Minimize potential problems to be encountered during construction and operation due to existing above or belowground structures or radioactive/hazardous contamination.

Performance Measurement 1: Presence of vadose zone contamination at the site.

ALTERNATIVE SITE 2	
PRO'S	CON'S
<ul style="list-style-type: none">• Low potential for contamination from hazardous chemicals• Outside of 200 East Area waste management area	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
<ul style="list-style-type: none">• Low potential for contamination from hazardous chemicals• Historically, outside of 200 East Area waste management area	<ul style="list-style-type: none">• Vadose zone contamination by trace levels of radionuclides (Swanson et al. 1988)
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	<ul style="list-style-type: none">• Inside 200 East Area waste management area.

Comments: None.

Robert G. Riley

Performance Measurement 2: Building sites should not be situated where there is a known source of contamination or above or belowground structures that could be encountered during construction and operation of the facility.

ALTERNATIVE SITE 2	
PRO'S	CON'S
<ul style="list-style-type: none"> Low potential for presence of above or belowground structures. 	<ul style="list-style-type: none"> Localized low-level surface and near-surface radioactive contamination (Swanson et al. 1988). There is potential for exposure to and accumulation of windblown surface contamination downwind of the 200 East Area (Reiman and Dahlstrom 1990).
ALTERNATIVE SITE 3	
PRO'S	CON'S
<ul style="list-style-type: none"> Low potential for presence of above or belowground structures. 	<ul style="list-style-type: none"> Localized low-level surface and near-surface radioactive contamination. There is potential for exposure to and accumulation of windblown surface contamination downwind of the 200 East Area.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	<ul style="list-style-type: none"> History of higher (relative to Sites 2 and 3) surface gamma radiation. Higher (relative to Sites 2 and 3) potential for above or belowground structures to be encountered based on historical and current facility operations and planned development activities.

Comments: None.

Robert G. Riley

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Site 3

Site 3 contains some areas of surface and vadose zone contamination and potential exposure to windblown contamination does exist. These factors are viewed as acceptable risk as surveys show (Tipton 1975; Feimster and Hilton 1982; Reiman and Dahlstrom 1990) declining levels of surface radiation releases and the size of the sites allows flexibility in locating facilities to avoid potentially unacceptable levels of contamination. Historically, Site 3 has been located outside the 200 East Area waste management area suggesting a much lower probability of encountering unsuspected radioactive or hazardous contamination and above or belowground structures that would impede facility construction and operation activities.

1. Alternative Site 2

Same as Site 3.

2. Alternative Site 4

Historically, the northern area of Site 4 has seen higher levels of surface radiation releases than at Sites 2 and 3. These higher levels of surface release are due to the presence of the ash disposal pile located in the more norther portion of Site 4. Plans are for removal of this pile. The southern portion of Site 4 is overgrown with sagebrush and undeveloped. Higher potential exists for encountering above or belowground structures because the site is located within the 200 East Area waste management area.

George V. Last/Mark T. Murphy

Risks

Seismic: The distance to known earthquake faults shall be taken into consideration.

Performance Measurement 1: Location of capable faults relative to site.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Site is farther than Site 3 from the Gable Mountain faults.	Site is closer than 4 from the May Junction fault.
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	Site is the closest to the trace of the Gable Mountain and May Junction faults.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site is the farthest from the trace of the Gable Mountain and May Junction faults.	None.

Comments: None.

George V. Last/Mark T. Murphy

Performance Measurement 2: Presence of subsurface soils that would lose strength under seismic shaking (liquefaction potential).

ALTERNATIVE SITE 2	
PRO'S	CON'S
Soils at Site 2 have undergone engineering testing and do not appear to be likely to liquify.*	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Soils at Site 3 have undergone engineering testing and do not appear to be likely to liquify.*	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Soils at Site 4 are not as well characterized as Sites 2 and 3 but appear to be unlikely to liquify.*	None.

Comments: *Giller, R. A., 1992, *Bibliography and Summary of Geotechnical Studies of the Hanford Site*, WHC-SD-GN-ER-30009, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

George V. Last/Mark T. Murphy

Performance Measurement 3: Orientation of structural trends relative to new or 'blind' faulting at site.

ALTERNATIVE SITE 2	
PRO'S	CON'S
All sites are oblique to the Umtanum/Gable Mountain primary structural trend.	All sites are online with secondary structures related to the Umtanum/Gable Mountain trend.
ALTERNATIVE SITE 3	
PRO'S	CON'S
All sites are oblique to the Umtanum/Gable Mountain primary structural trend.	All sites are online with secondary structures related to the Umtanum/Gable Mountain trend.
ALTERNATIVE SITE 4	
PRO'S	CON'S
All sites are oblique to the Umtanum/Gable Mountain primary structural trend.	All sites are online with secondary structures related to the Umtanum/Gable Mountain trend.

Comments: None.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

General: From a seismic standpoint, there is little difference between the alternative sites and nothing to significantly affect the design and construction of the Phase I demonstration facilities at any site.

1. Alternative Site 4

This site is the farthest from Gable Mountain and May Junction faults giving it a slight advantage over Sites 2 and 3.

2. Alternative Site 2

Although there is no significant seismic risk associated with this site, its proximity to the May Junction fault and Gable Mountain fault give it a slight disadvantage relative to Site 4.

3. Alternative Site 3

Same as for Site 2; however, this site is closer to the Gable Mountain fault, giving it a slight disadvantage relative to Site 2.

Edward F. Yancey

Risks

Site Activities: The impact to other site activities and operating facilities during construction and operation should be kept to a minimum.

Performance Measurement 1: The optimum site shall not be located adjacent to major concentrations of employees.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Not located adjacent to major concentration of employees.	None.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Not located adjacent to major concentration of employees.	None.
ALTERNATIVE SITE 4	
PRO'S	CON'S
None.	Located adjacent to three major population centers in the 200 East Area.

Comments: None.

Edward F. Yancey

Performance Measurement 2: The optimum site shall not impact existing safety analyses.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
See comments.	See comments.

Comments: Safety analysis/assessment will be written for the privatization projects in accordance with DOE Order 5480.23, *Nuclear Safety Analysis Reports* (DOE 1992). Any impacts to or by the adjoining facilities/collocated workers will be addressed at that time. All sites (1, 2, 3, 4) are located beyond 100 m from existing tank farm facilities so that minimum impacts are expected on onsite workers/facilities workers.

Performance Measurement 3: The optimum site shall minimize additional traffic congestion.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
See comments.	See comments.

Comments: All the sites likely will increase traffic congestion because of the new project activity.

Edward F. Yancey

Performance Measurement 4: The optimum site shall not be located in areas that will be affected by burial ground closures and remedial action activities.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
See comments.	See comments.

Comments: For all sites there are no conflicts with burial ground closures, and only minor remedial action activities.

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

1. Alternative Sites 2 and 3

Sites 2 and 3 are located downwind (prevailing direction is based on "Hanford Site Climatological Data Summary 1993 with Historical Data") and away from major population centers in the 200 East Area (the closest one is PUREX).

All the sites are relatively clean; there are no conflicts with burial ground closures, and only minor remedial action activities.

Facilities with SARs were identified and an arbitrary 0.8-km (0.5-mile) radius was drawn around each facility on a basemap. The map was then used to estimate land areas located outside the SAR boundaries. Safety analysis/assessment will be written for the privatization projects in accordance with DOE Order 5480.23, *Nuclear Safety Analysis Reports* (DOE 1992). Any impacts to or by the adjoining facilities/collocated workers will be addressed at that time. All sites (1, 2, 3, 4) are located beyond 100 m from existing tank farm facilities so that minimum impacts are expected on onsite workers/facilities workers.

In general, all the sites will likely increase traffic congestion because of the new project activity. They all have the potential for impacting traffic at the Canton Avenue and Route 4S intersection, more so during evening rush hour. The problem is the Canton Avenue intersection was not

Edward F. Yancey

designed to accommodate southbound traffic from Canton Avenue onto Route 4S. All the sites also have the potential for creating a new entrance road from Route 4S.

2. Alternative Site 4

Site 4 is different from the other two sites in that it is located adjacent to three major population centers in the 200 East Area: B Plant, PUREX, and the general support area in the southwest corner of the 200 East Area. One of these centers, PUREX, is located downwind (prevailing wind direction). This one performance measurement was the only reason Sites 2, 3, and 4 were not considered equal.

John D. Galbraith/Carole E. Leach

Risks

Adjacency of Sites:

1. Vendor-to-Vendor Interference: The vendor facility sites shall be such that one vendor's activities or upsets do not hinder or prevent progress to be made by a separate vendor.
2. Siting, Infrastructure, and Support Incompatibility with Vendors' Operating Concepts: The siting shall be such that Hanford Site infrastructure and support are (or can feasibly be made) compatible with the vendors' operating concepts.
3. Siting, Infrastructure, and Support Incompatibility with U.S. Department of Energy (DOE) privatization strategy: The siting shall be such that Hanford Site infrastructure and support are (or can feasibly be made) compatible with the DOE's overall strategy to complete the full waste processing mission.

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Performance Measurement 1: Ensure vendor-to-vendor non-interference or disruption of construction/operation.

ALTERNATIVE SITE 2	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 3	
PRO'S	CON'S
See comments.	See comments.
ALTERNATIVE SITE 4	
PRO'S	CON'S
See comments.	See comments.

Comments:

Sites 2 and 3: Sites 2 and 3 are similar in terms of useable land mass. Therefore, they would provide less distance between vendors than Site 4.

Site 4: An obvious conclusion is that Site 4 is most advantageous from the standpoint of the stated performance measure. This is only true if the distance between two (or three?) vendors within a 81-ha (200-acre) plot is meaningful, i.e., shutdown of 'common' services due to an error by the other vendor.

Purposefully maximizing distance between two or three vendors on Site 4, however, is probably not an efficient use of land. This would also be costly in terms of infrastructure upgrades.

Use of Site 4 for Phase I would have a negative effect on Phase II because the land area available would be limited as a result of Phase I facilities and infrastructure.

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Performance Measurement 2: Adequately support the needs of the vendors' operating concepts.

ALTERNATIVE SITE 2	
PRO'S	CON'S
Situated relatively close to AP Tank Farm.	If large prefabricated modules or components are used in the vendors' designs, efficient maintenance and operations may depend on the availability of rail or special road requirements.
ALTERNATIVE SITE 3	
PRO'S	CON'S
Because Site 3 is situated closest to the AP Tank Farm, it would prove to be most advantageous from the standpoint of vendor tank farm operational convenience.	Same as Site 2.
ALTERNATIVE SITE 4	
PRO'S	CON'S
Site 4 is most favorably situated to accommodate any need for rail service.	Farthest of all sites from AP Tank Farm.

Comments: None.

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Performance Measurement 3: Adequately support the overall DOE strategy for the full waste processing mission (Phase I and Phase II).

ALTERNATIVE SITE 2	
PRO'S	CON'S
None.	By itself, Site 2 could not accommodate Phase I and II processing. Hence, use of Site 2 in Phase I would necessarily result in the use of a physically separated site for Phase II. This limits or eliminates the possibility of Phase I expansion into Phase II.
ALTERNATIVE SITE 3	
PRO'S	CON'S
None.	Same as Site 2.
ALTERNATIVE SITE 4	
PRO'S	CON'S
If Phase II would only involve one vendor, Site 4 could conceivably accommodate both Phase I and II construction and operations.	The disadvantage of using Site 4 during Phase I, as currently defined, is the potential to deplete necessary space for subsequent construction and operation of Phase II. This is a concern if Phase I and Phase II strategies maximize the number of individual vendors and facilities.

Comments: None.

John D. Galbraith/Carole E. Leach

OVERALL EVALUATION (IN ORDER OF PREFERRED SITE)

General Comments

In terms of vendor-to-vendor non-interference, the net effect of the pro's and con's is that no site is really favored over another. Hence, there does not appear to be a distinct preference. If this issue is truly considered to be a driving risk factor, thought may be given to using more than one of the sites for Phase I (e.g., one vendor in site 'x' and one vendor in site 'y').

In terms of supporting vendor needs, proximity to the AP Farm weighs in favor of Site 3. However, without an understanding of the actual vendor designs, there could be some shortfalls to Site 3. An example is feasibility of rail and special road service. It may be important to note as a part of this evaluation that not all criteria can be guaranteed at this time.

In terms of supporting the overall strategy of the DOE processing mission, selection of Sites 2 or 3 could limit efficient integration of Phase I facilities and operations into or with Phase II. Conversely, inefficient use of land in Site 4 for Phase I or the decision by the DOE to use three vendors in Phase I and multiple vendors in Phase II eliminates the possibility of using any ONE site for Phases I and II.

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APPENDIX C

COLLOCATION OF PHASE I AND PHASE II
(PRODUCTION) FACILITIES

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APPENDIX C

COLLOCATION OF PHASE I AND PHASE II
(PRODUCTION) FACILITIES

Based on the current Phase II (production) privatization strategy, an evaluation was conducted on whether the Phase I and Phase II facilities could be collocated. The largest alternative area (Site 4) was chosen for the evaluation. As previously identified in this report, before the privatization concept, this area was previously evaluated and recommended for location of the Tank Waste Remediation System (TWRS) production facilities to treat tank waste, vitrify high-level waste (HLW) and low-level waste (LLW), dispose of LLW, and interim store HLW (Shord 1995). The Phase II strategy assumes that two vendors would each construct facilities for pretreatment/separations processing, LLW immobilization, HLW vitrification, and support facilities.

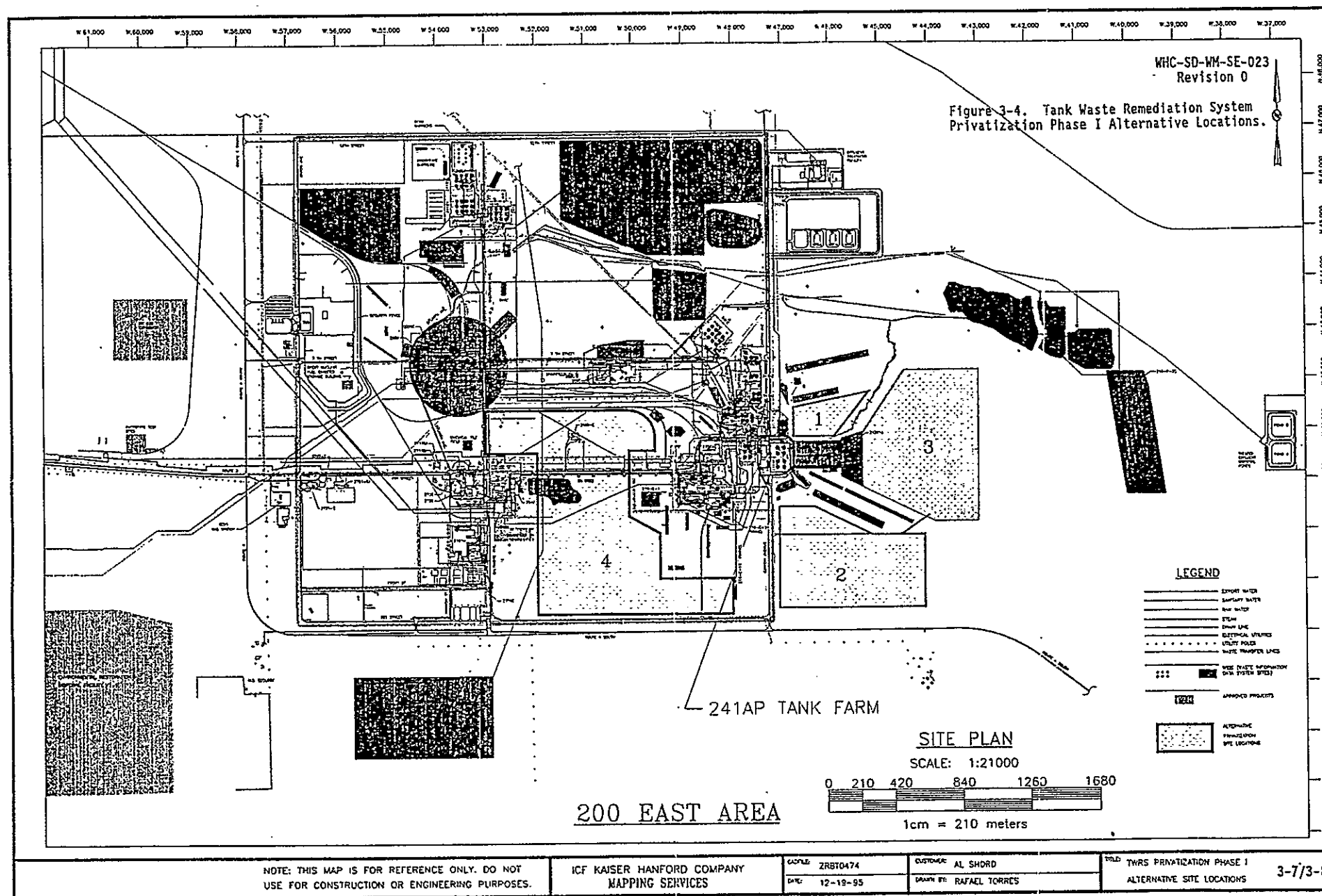
The resultant layout is shown in Figure C-1. Another option (layout not provided) would be for the two vendors to each construct an LLW Immobilization Facility with a combined pretreatment/separations processing, HLW Vitrification Facility, and support facilities. Either option would effectively use all or most of the 200 East central area (Site 4). The assumptions with either option are as follows.

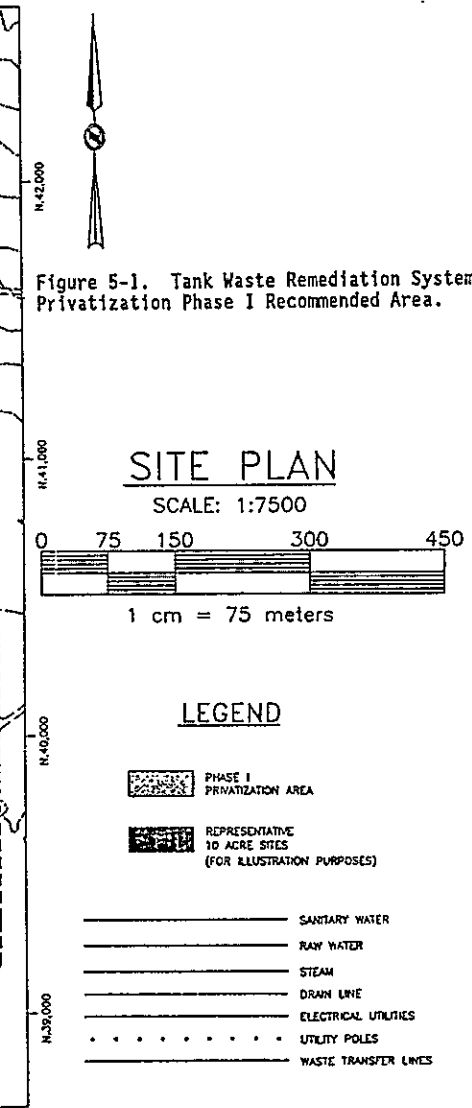
- Shared facilities/structures would be the LLW disposal vaults and the HLW cask pad(s).
- Facilities that are not shown (facilities not provided) in Figure C-1 but may be needed by the vendor(s) are: fabrication/assembly shops, warehouse(s), and service/storage yards. It is assumed that these services would either be provided by existing Hanford Site facilities/services or that the services would be located offsite. (NOTE: Support facilities requirements were evaluated in previous TWRS studies. The recommendations of these studies have been carried forward in Figure C-1.)
- The site as shown will require a significant coordination and integration between the vendors during the construction phase because there is little room for construction laydown. Phased construction will be required to support this issue and also may require pilings to be used in areas where the facilities/structures require below-surface structures and foundations.
- The site as shown assumes that the ash pile associated with the 200 East Area power plant/steam plant will have to be removed. This is assumed to be achievable because the current plan is to have the power plant replaced with packaged steam units installed between 1998 to 2000 to support existing Hanford Site facilities. It is also assumed that the vendors will be responsible for supplying their own steam.

- The Dry Materials Receiving and Handling Facility, which supported the Grout operations, will either have to be removed or the vendor could revitalize the facility to support the receipt and storage of dry materials required for the vitrification process.
- Railroad service to the sites as shown has assumed that connection to the existing 200 East Area rail systems is feasible. The layouts have assumed a minimum 61-m (200-ft) radius for all turns. The extent of rail service is at the option of the vendor(s) and may or may not be required because most of the equipment and products could be moved by vehicle, i.e., trucks with trailers.
- A new diversion box with a complement of transfer lines will need to be added to the 200 East Area waste transfer system. The diversion box would be tied into the new cross-site transfer system/Project W-058 north of the central site. New lines would be added that would extend east to the AN Tank Farm. This system, in addition to the new cross-site transfer system, would support the transfer of waste from the A Farm Complex to the vendors. If a new diversion box is built for Phase II, the risk to the Phase II facilities and workers will need to be addressed in the project-specific documents.

C1.0 REFERENCES

Shord, A. L., 1995, *Tank Waste Remediation System Complex Site Evaluation Report*, WHC-SD-WM-SE-021, Rev. 0, Westinghouse Hanford Company, Richland, Washington.






SITE PLAN

Age Group	Number of People
0-4	~100
5-14	~150
15-24	~350
25-34	~250
35-44	~150
45-54	~100
55-64	~50
65-74	~20
75+	~10

1 cm = 75 meters



PHASE I
PRIVATIZATION AREA

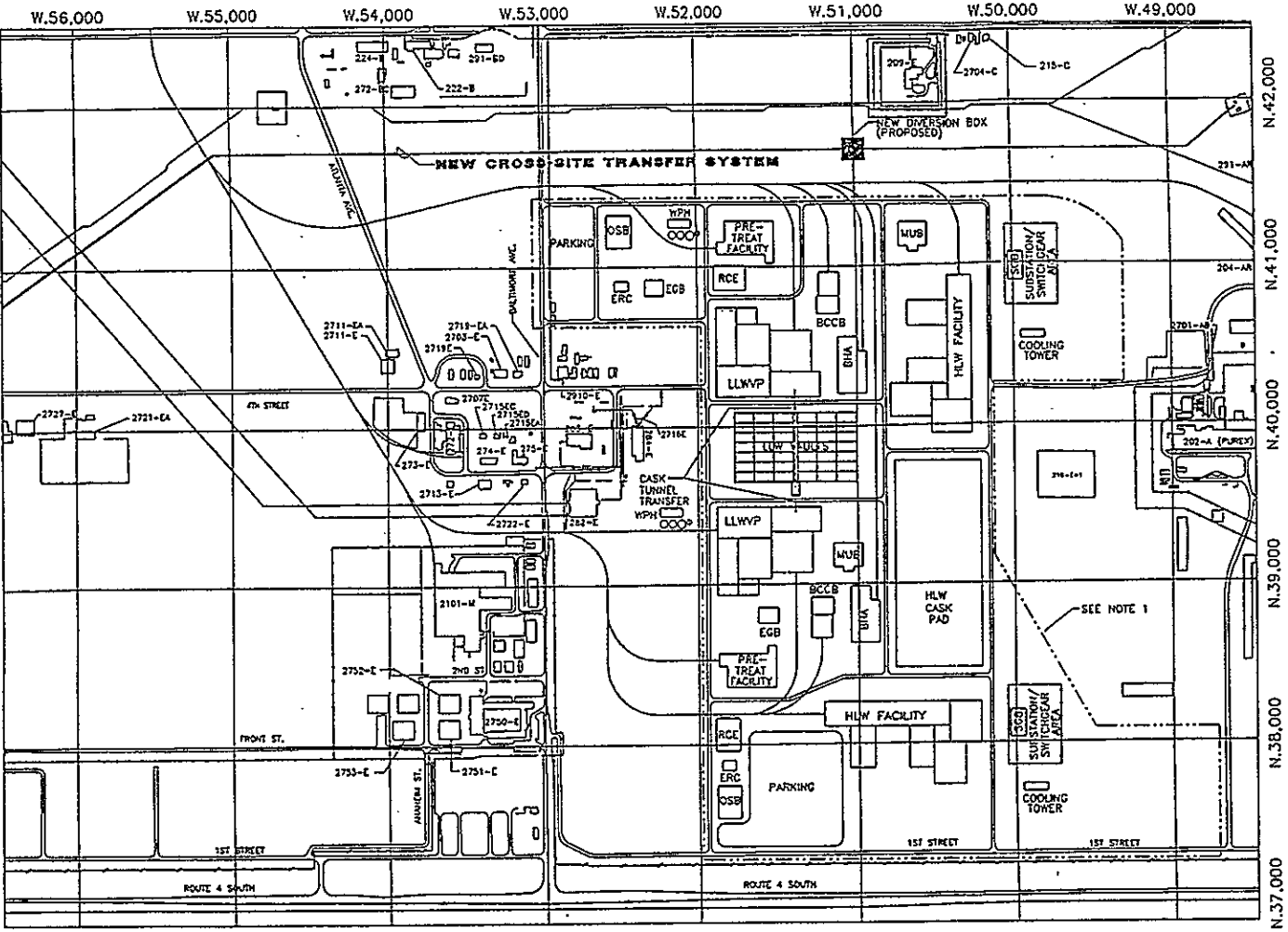


REPRESENTATIVE
10 ACRE SITES
(FOR ILLUSTRATION PURPOSES)

- _____ SANITARY WATER
 _____ RAIN WATER
 _____ STEAM
 _____ DRAIN LINE
 _____ ELECTRICAL UTILITIES
 • • • • • UTILITY POLES
 _____ WASTE TRANSFER LINES

FILE	TWRS PRIVATIZATION PHASE I	5-3/5-4
	RECOMMENDED AREA	

Figure C-1. 200 East Area Privatization Phase II.



LEGEND

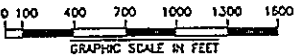
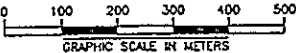
BCCB	BULK COLD CHEMICAL BUILDING
BHA	BULK HANDLING AREA
EGB	EMERGENCY GENERATOR BUILDING
HLWVP	HLW VITRIFICATION BUILDING
	CONTACT FILTER/BLOWER ROOM ANNEX
	CONDENSATE COLLECTION ANNEX
	CANISTER/CASK HANDLING ANNEX
	FAN/FILTER ANNEX
	REGULATED FACILITY ENTRY ANNEX
LLWVP	LLW VITRIFICATION BUILDING
	CONTACT FILTER/BLOWER ROOM ANNEX
	CONDENSATE COLLECTION ANNEX
	CANISTER/CASK HANDLING ANNEX
	FAN/FILTER ANNEX
	REGULATED FACILITY ENTRY ANNEX
MUB	MECHANICAL UTILITY BUILDING
OSB	OPERATIONS SUPPORT BUILDING
RCE	REGULATED COMPLEX ENTRY
SGB	SWITCHGEAR BUILDING
WPH	WATER PUMPHOUSE
ERC	EMERGENCY RESPONSE CENTER

FACILITIES NOT PROVIDED:

FAS	FABRICATION & ASSEMBLY SHOP
SERV/STOR	SERVICE/STORAGE YARD
WHSE	WAREHOUSE

NOTE:

1. OVERALL AREA OF THE THIS PHASE II TREATMENT COMPLEX IS 250 ACRES.



200 EAST AREA
PRIVATIZATION
PHASE II

00500101 (9-26-95)